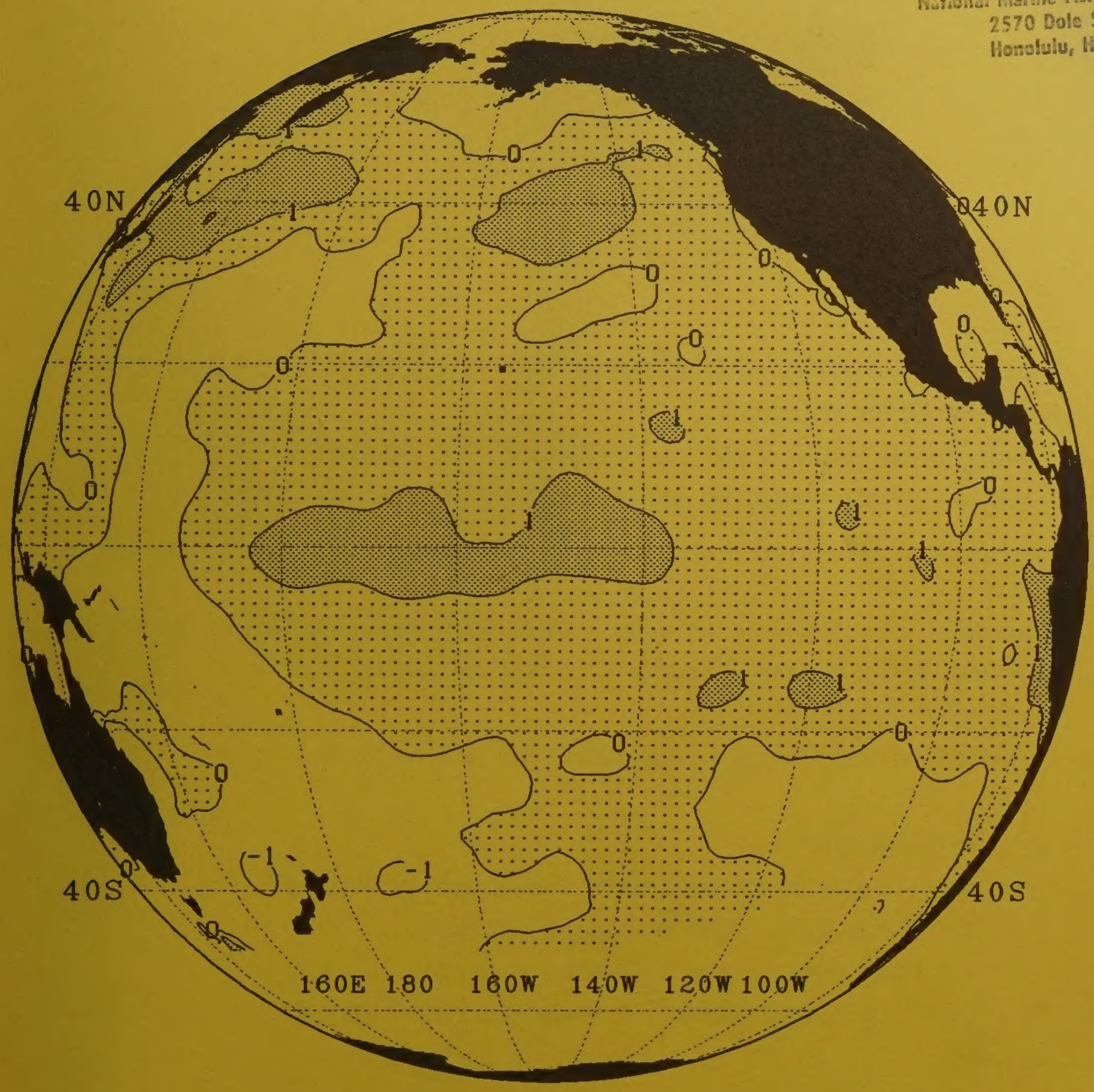
気象庁海洋月報

Monthly Ocean Report

October 1994 (No. 22)



El Niño Monitoring Center
Japan Meteorological Agency

気象庁海洋気象部海洋課
エルニーニョ監視センター

平成6年10月

気象庁海洋月報は、気象庁海洋気象部海洋課エルニーニョ監視センターで作成されています。
本月報に関する問い合わせは、

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Monthly Ocean Report is prepared by the El Niño Monitoring Center, Oceanographical Division, Marine Department, Japan Meteorological Agency.

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表紙は1994年10月の太平洋の月平均海面水温偏差図です。
陰影部は平年より高温の海域を示しています。

The figure on the front cover shows the monthly mean SST anomalies for October 1994 in the Pacific Ocean.
Areas of positive anomalies are shaded.

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海況の特徴（１９９４年１０月）

太平洋の海況

太平洋赤道域の海面水温は、170°Ｅから南米沖にかけて平年より高かった。特に、日付変更線から140°Ｗにかけて平年より１℃以上高く、日付変更線付近では30℃を越えていた。また、南米沿岸の20°Ｓから赤道にかけても平年より１℃以上高かった。エルニーニョ監視海域（4°Ｓ～4°Ｎ、150°Ｗ～90°Ｗ）の海面水温偏差は、+0.7℃だった（第１表、第１図、第６図）。

赤道域表層の28℃以上の暖水層は、日付変更線から170°Ｗにかけては先月とほぼ同じ厚さで、深さ100ｍ以上に達していた。また、日付変更線付近では、８月から引き続いて30℃以上の暖水がみられた。東部赤道域の120°Ｗから90°Ｗにかけて、20℃の等温線の深さが先月に比べて約50ｍ深くなった（第３図）。

気象庁の海洋気象観測船「啓風丸」は10～11月に137°Ｅ線に沿って日本近海から赤道にかけて海洋観測を行った。その結果、10°Ｎ以南の28℃以上の暖水の厚さは、50～60ｍで、昨年同期に比べて厚かった（図Ａ）。

北太平洋では、40°Ｎに沿って本州東方から日付変更線にかけて平年より１～２℃高かった。また、アラスカ湾沖の40°Ｎ、150°Ｗ付近では平年より1℃以上高い状態が続いていた。一方、20～30°Ｎの150°Ｅから170°Ｗにかけて平年より低かった（第１図）。

日本近海の海況

日本近海は、東シナ海、九州南方で平年より低いほかは、全般に平年より高く、特に、三陸沖と北海道西方では2℃以上高かった（第17図）。

黒潮は日本の南岸に沿ってほぼ直進し、房総半島沖を東に流れていた（第20図）。

本州東方の親潮系の冷水（深さ100ｍで5℃以下）は、沿岸寄りの分枝は40.1°Ｎ・144.2°Ｅまで、沖合の分枝は39.6°Ｎ・147.2°Ｅまで、それぞれ達していた（第19図）。

熱帯の気象

対流圏上層の大規模な発散の中心は、平年より約20°東の160°Ｅ付近にみられた。赤道付近の下層の東西風は、太平洋赤道域の160°Ｅ以東では全域で西風偏差であった。一方、インド洋から海洋大陸にかけては強い東風偏差がみられた。南方振動指数（ＳＯＩ）は-1.5と大きな負の値が今月も継続した（第１表、第12図、第13図）。

［気象庁長期予報課提供］

HIGHLIGHTS October 1994

Pacific

Sea surface temperatures (SSTs) in the equatorial Pacific were above normal between 170°E and off the South America. SSTs were more than 1°C above normal between the date line and 140°W, and greater than 30°C near the date line. SSTs in the coastal area of the South America were more than 1°C above normal from 20°S to the equator. The SST index for region B (Fig. 6) was +0.7°C (Table 1 and Figs. 1 and 6).

The thickness of surface warm water (above 28°C) along the equator has not varied between 170°E and the date line since last month and exceeded 100 m. The warmest water greater than 30°C has been observed near the date line since August. The depth of 20°C isotherm along the equator between 120°W and 90°W was about 50 m deeper than that of last month (Fig. 3).

According to the oceanographic observation by R/V Keifu Maru of JMA from 32°N to 3°N along 137°E in October and November 1994, surface warm water (above 28°C) at south of 10°N was thicker than that observed in the same months in 1993 (Fig. A).

In the North Pacific, SSTs were above normal along 40°N from east of Honshu to the date line, and continued to be more than 1°C above normal off the Gulf of Alaska. SSTs between 20°N and 30°N from 150°E to 170°W were below normal (Fig. 1).

Seas adjacent to Japan

SSTs in the seas adjacent to Japan were above normal except in the East China Sea and south of Kyushu. SSTs were notably more than 2°C above normal west of Hokkaido and off Sanriku (Fig. 17).

The Kuroshio flowed straight along the south coast of Japan, then flowed eastward off the Boso Peninsula (Fig. 20).

The Oyashio cold water (below 5°C at a 100 m depth) extended southward to 40.1°N, 144.2°E and 39.6°N, 147.2°E, respectively (Fig. 19).

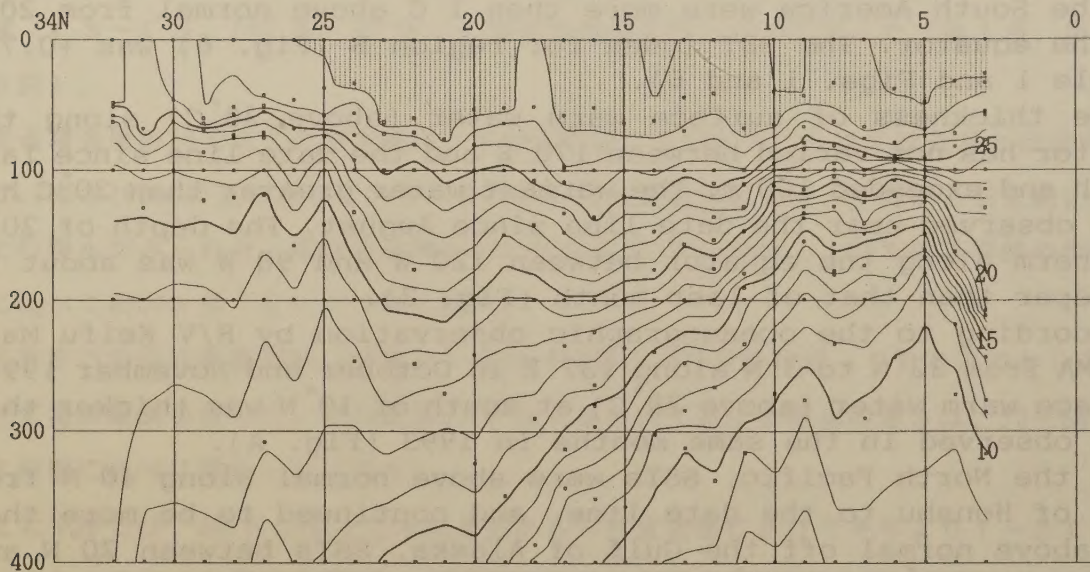
Atmospheric conditions in the tropics

The center of divergence at 200 hPa was observed at 160°E about 20 degrees eastward from the normal position. Low-level equatorial easterlies were stronger than normal from the Indian Ocean to the maritime continent and weaker than normal from 160°E to the west coast of South America.

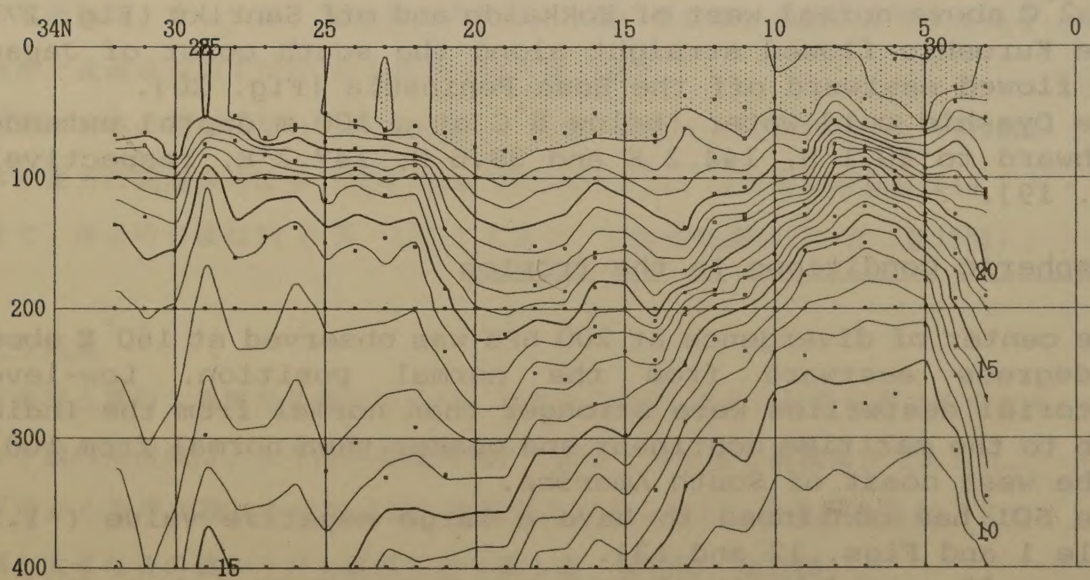
The SOI has continued to have a large negative value (-1.5) (Table 1 and Figs. 12 and 13).

[Prepared by the Long-range Forecast Division, JMA]

Depth-Latitude Section of Temperature along 137°E



October − November 1994



October − November 1993

図－A　137°Eに沿う表層水温断面図（上：1994年10〜11月、下：1993年10〜11月）

Fig. A　Depth-latitude section of ocean temperature along 137°E for October/November 1994(top) and October/November 1993(bottom). The contour interval is 1°C.

Date		1993								1994									
		MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Pacific Sea Surface Temperature (℃)																			
D	(14N～ Eq.)	28.8	29.2	29.1	28.9	29.1	29.1	29.5	29.1	28.4	28.5	28.6	29.1	29.4	29.6	29.2	29.3	29.1	29.3
	(130E～150E)	-0.3	-0.1	-0.1	-0.2	-0.1	-0.2	+0.3	+0.2	-0.1	+0.2	+0.2	+0.3	+0.3	+0.3	0.0	+0.2	-0.1	0.0
A	(4N～ 4S)	29.0	29.1	29.1	28.8	29.1	28.8	28.9	28.7	28.2	28.0	28.2	28.4	28.9	29.0	29.2	29.4	29.1	29.2
	(160E～150W)	+0.5	+0.6	+0.6	+0.4	+0.8	+0.4	+0.5	+0.5	+0.2	0.0	+0.1	+0.2	+0.4	+0.5	+0.7	+1.0	+0.8	+0.8
B	(4N～ 4S)	28.0	27.0	25.8	24.9	24.8	25.0	25.2	25.3	25.7	26.1	26.9	27.0	26.8	26.3	25.1	24.6	24.6	25.3
	(150W～ 90W)	+1.4	+0.9	+0.6	+0.3	+0.2	+0.4	+0.6	+0.4	+0.3	-0.1	0.0	-0.1	+0.2	+0.2	-0.1	0.0	0.0	+0.7
C	(Eq. ～ 10S)	25.2	23.3	22.1	21.0	20.8	21.3	21.5	22.8	24.7	26.0	25.3	24.2	23.4	22.2	21.2	20.6	19.9	21.6
	(90W～ 80W)	+1.3	+0.6	+0.5	+0.4	+0.5	+0.6	0.0	+0.2	+0.4	+0.3	-0.6	-0.9	-0.5	-0.5	-0.4	0.0	-0.4	+0.9
Pacific Sea Level Anomaly (cm)																			
YAP	(10N, 138E)	-2	-2	1	-1	5	8	8	10	7	7	6	2	2	7	9	1	-5	
RABAUL	(4S, 152E)	-13	-11	-8	-9	-7	-6	-5	-2	-1	3	4	5	3	1	2	0	-	
MAJURO	(7N, 171E)	-1	6	5	3	1	5	2	3	2	2	3	5	1	-2	-1	0	0	
TARAWA	(1N, 173E)	5	6	4	7	4	6	2	1	6	-1	6	6	7	6	9	-	14	
CHRISTMAS	(2N, 157W)	5	-1	-2	-1	-1	-2	-1	-7	-3	-7	0	0	1	1	4	7	4	
SANTA CRUZ	(1S, 90W)	10	4	0	0	1	3	0	0	-1	0	-4	-8	-3	1	0	-1	1	

第1表（a）エルニーニョ監視指数

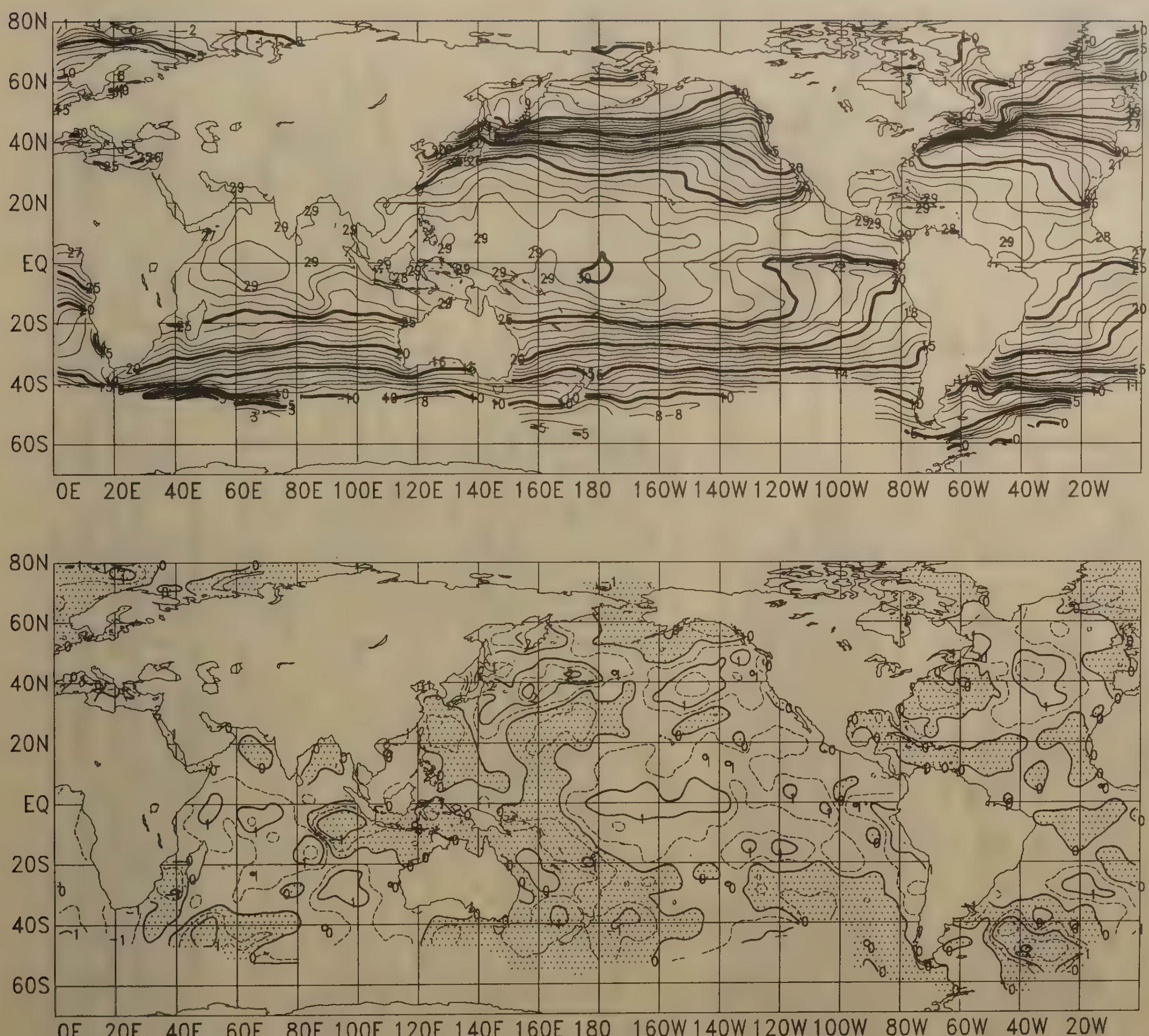
Table 1(a) El Niño monitoring indices. Data sources are the El Niño Monitoring Center, JMA for the sea surface temperature and the SOC of ISLP-PAC, Department of Oceanography, University of Hawaii for the sea level anomaly.

Date		1993							1994									
		MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Southern Oscillation Index																			
SOI	(TAHITI-DARWIN)	-0.8	-1.6	-1.0	-1.5	-0.7	-1.4	-0.0	0.2	-0.2	0.1	-0.8	-2.1	-1.4	-1.0	-1.6	-1.8	-1.6	-1.5
TAHITI	(17.5S, 150W)	0.2	-0.6	-1.1	0.0	-0.0	-0.9	0.1	-0.0	-0.1	0.0	-0.1	-1.5	-0.8	-0.9	-1.5	-0.7	-1.5	-1.1
DARWIN	(12.5S, 131E)	1.4	1.3	0.4	2.2	1.4	1.3	0.1	-0.5	0.3	-0.2	1.7	1.2	1.0	0.3	1.0	2.0	1.5	1.2
High Cloud Amount Index																			
HCLD-PH	(20N ～ 10N) (110E ～ 140E)	-2.2	-1.9	-0.5	-0.4	0.7	-0.1	-0.6	1.2	-0.5	-0.5	0.6	0.7	0.2	-0.3	3.5	-0.9	0.2	-0.6
HCLD-MC	(5N ～ 5S) (110E ～ 135E)	-1.4	-2.1	-1.0	-1.4	-1.0	-1.5	-0.8	-0.2	-0.4	-0.5	0.8	0.4	0.4	-1.0	-1.1	-1.1	-1.1	-1.9
HCLD-DL	(5N ～ 5S) (170E ～ 170W)	2.0	1.8	1.3	0.3	1.8	1.7	-0.2	0.0	0.0	-0.7	-0.6	0.4	-0.3	-0.3	-0.5	0.4	1.4	0.2
Equatorial Zonal Wind Index																			
U200-IN	(5N ～ 5S) (80E ～ 100E)	0.5	0.4	-0.3	-0.5	-2.1	-0.7	-0.8	-1.8	-0.4	-0.8	-1.5	-0.2	-0.3	-0.5	-1.2	-0.6	-0.9	1.1
U200-CP	(5N ～ 5S) (180 ～ 125W)	-1.3	-0.0	1.1	0.3	-0.3	0.0	-0.5	0.4	0.4	0.8	0.2	-0.3	-0.5	-0.7	0.4	0.0	0.1	-0.9
U850-WP	(5N ～ 5S) (160E ～ 175W)	0.5	0.3	0.1	0.7	-0.0	0.9	-0.4	-0.7	-1.2	-1.0	-0.6	-0.5	-0.3	-0.4	0.1	0.6	0.4	0.9
U850-CP	(5N ～ 5S) (170W ～ 135W)	0.6	0.6	-0.8	0.1	0.2	0.4	0.3	-0.5	-0.6	-0.9	-0.2	-0.4	0.2	-0.6	-0.1	0.0	0.3	1.2
U850-EP	(5N ～ 5S) (130W ～ 100W)	0.9	0.7	-0.4	0.8	1.0	0.2	0.9	0.2	0.1	-0.4	0.1	-0.5	0.0	-0.5	-1.3	-1.8	0.9	0.8

第1表（b）エルニーニョ監視指数(続き)

Table 1(b) El Niño monitoring indices (continued).
Data source for these atmospheric conditions is the Long-range Forecast Division, JMA.

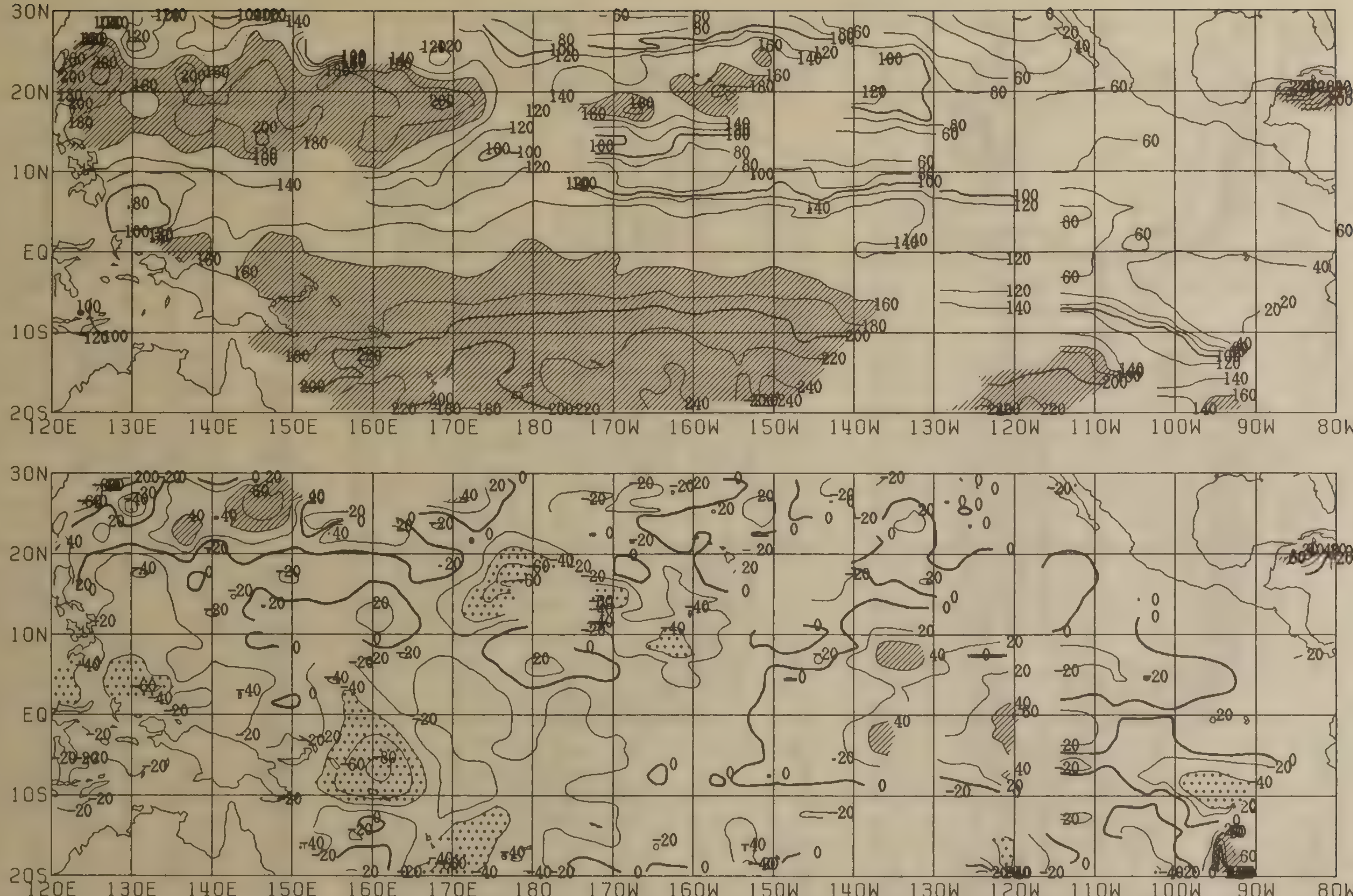
SST & Anomalies in the Global Ocean



第１図　全球月平均海面水温図（上）及び偏差図（下）（1994年10月）

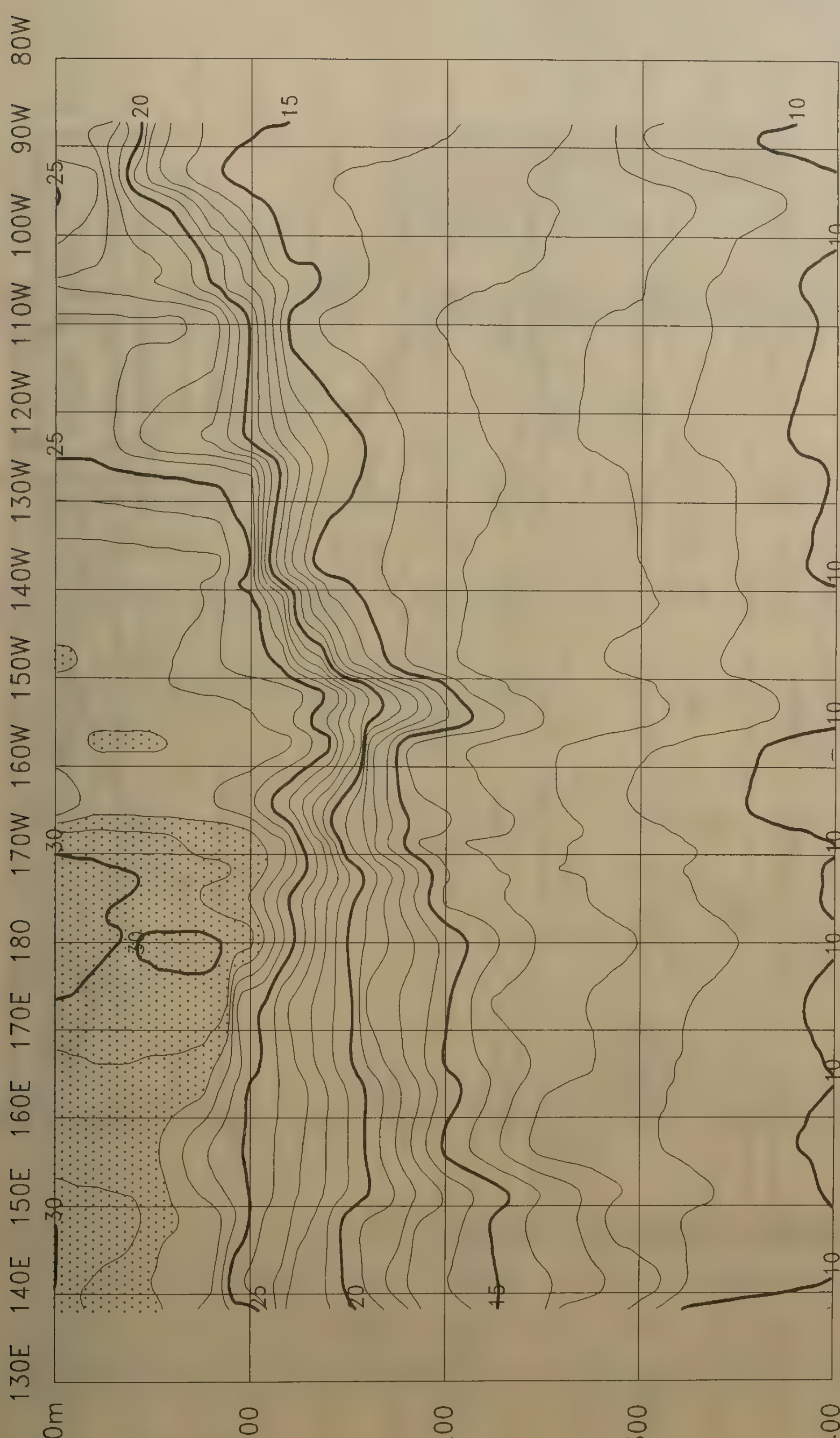
Fig.1 Monthly mean sea surface temperature in the global ocean (top) and anomalies (bottom) for OCT 1994. Anomalies are computed with respect to the JMA climatology (1961–90) (Climatic charts of sea surface temperatures of the western North Pacific and the global ocean, March 1991). The Contour interval is 1° C and additional anomaly contours of ±0.5° C are shown as broken lines. Negative anomalies are stippled.

Depth of 20°C & Anomalies in the Pacific Ocean



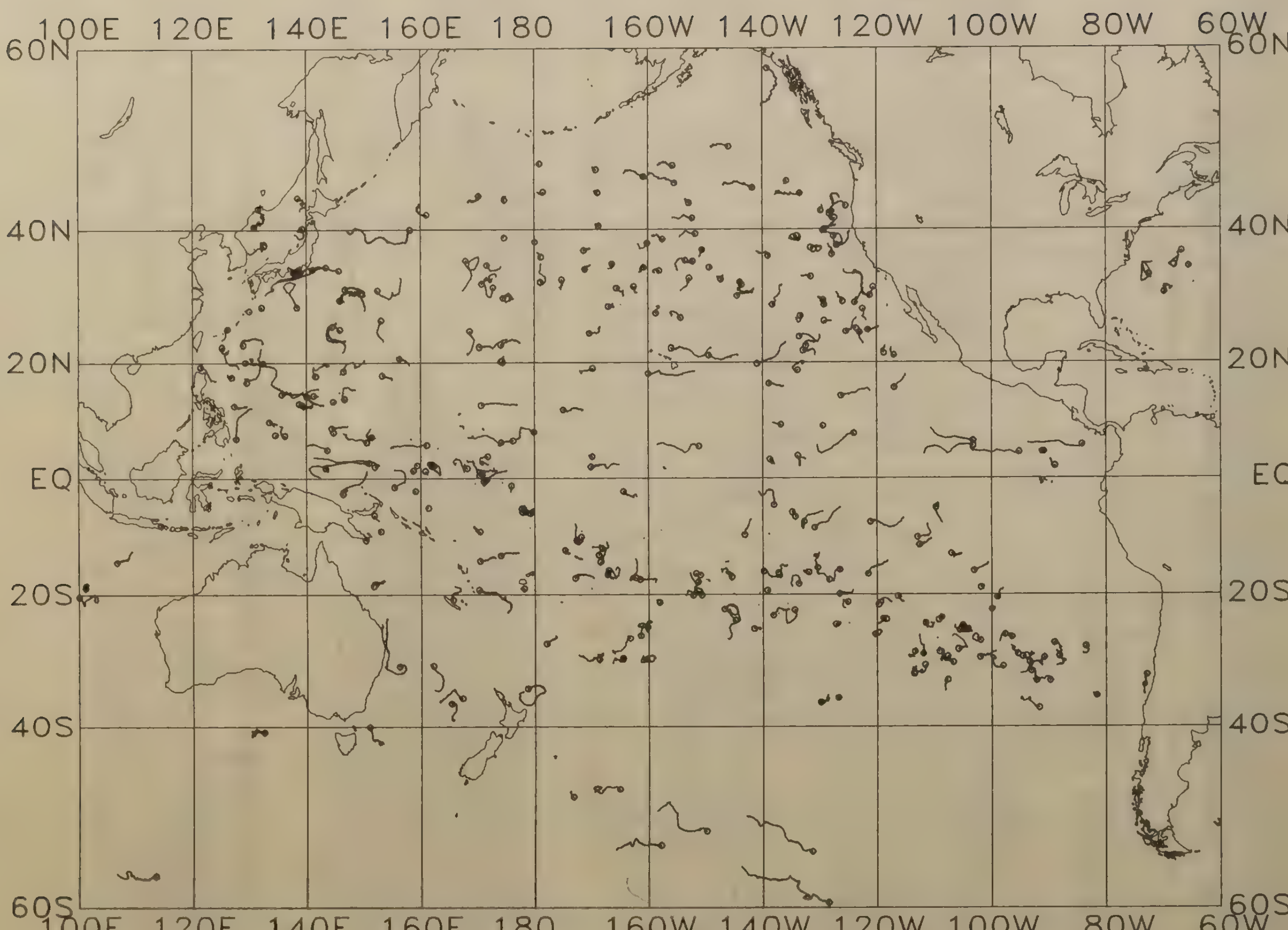
第２図　太平洋表層水温（20℃深度）図（上）及び偏差図（下）（1994年10月）
Fig.2　The depth of a 20°C isotherm in the Pacific Ocean (top) and anomalies (bottom) for OCT 1994. Anomalies are computed with respect to the climatology (Levitus, 1982, Climatological Atlas of the World Ocean, NOAA).
The contour interval is 20m with shading for values greater than 160m (top), and shading/stippling for values greater/smaller than +40m/−40m (bottom).

Depth−Longitude Section of Ocean Temperature



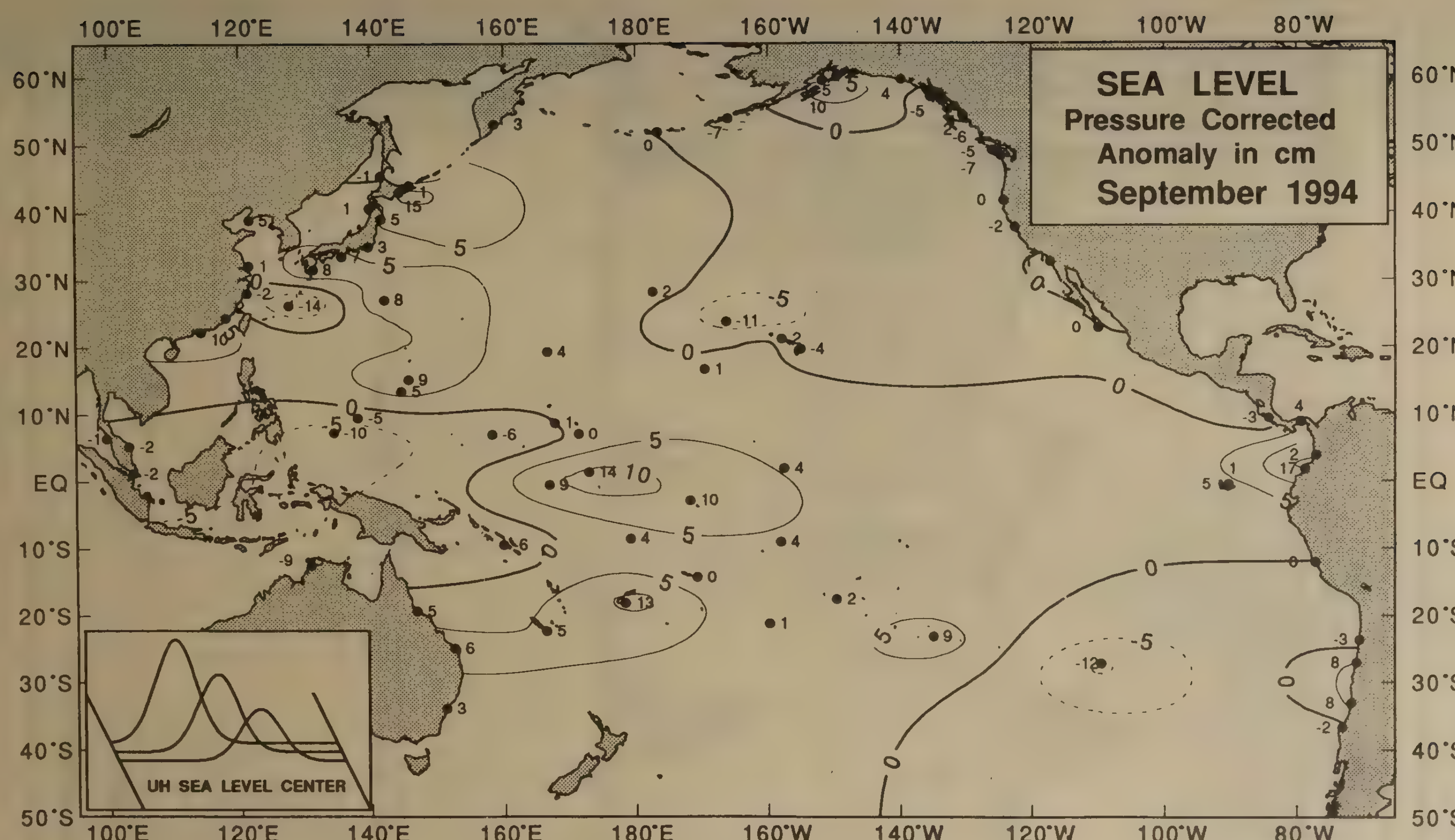
第３図　太平洋赤道に沿う表層水温断面図（1994年10月）

Fig.3 Depth−longitude section of the Pacific Ocean temperature along the equator for OCT 1994. The contour interval is 1° C with spotted shading for values greater than 28° C.



第4図　太平洋ブイ流跡図(1994年10月)

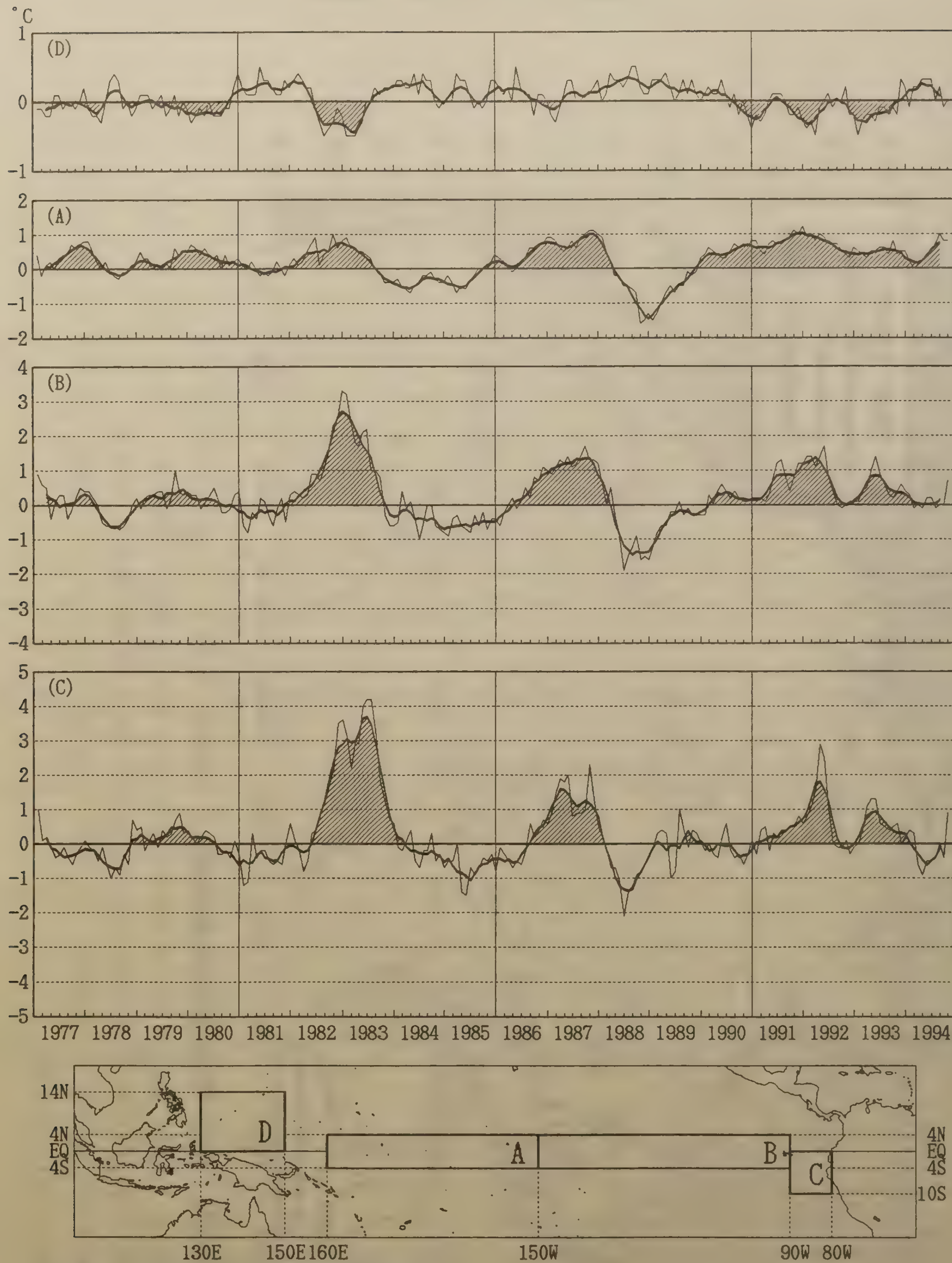
Fig.4 Movements of drifting buoys in the Pacific Ocean during OCT 1994. Each track is one buoy, with the small circle representing the buoy's last position for the month.



第5図　太平洋海面水位偏差図（ 1994年 9月 ）

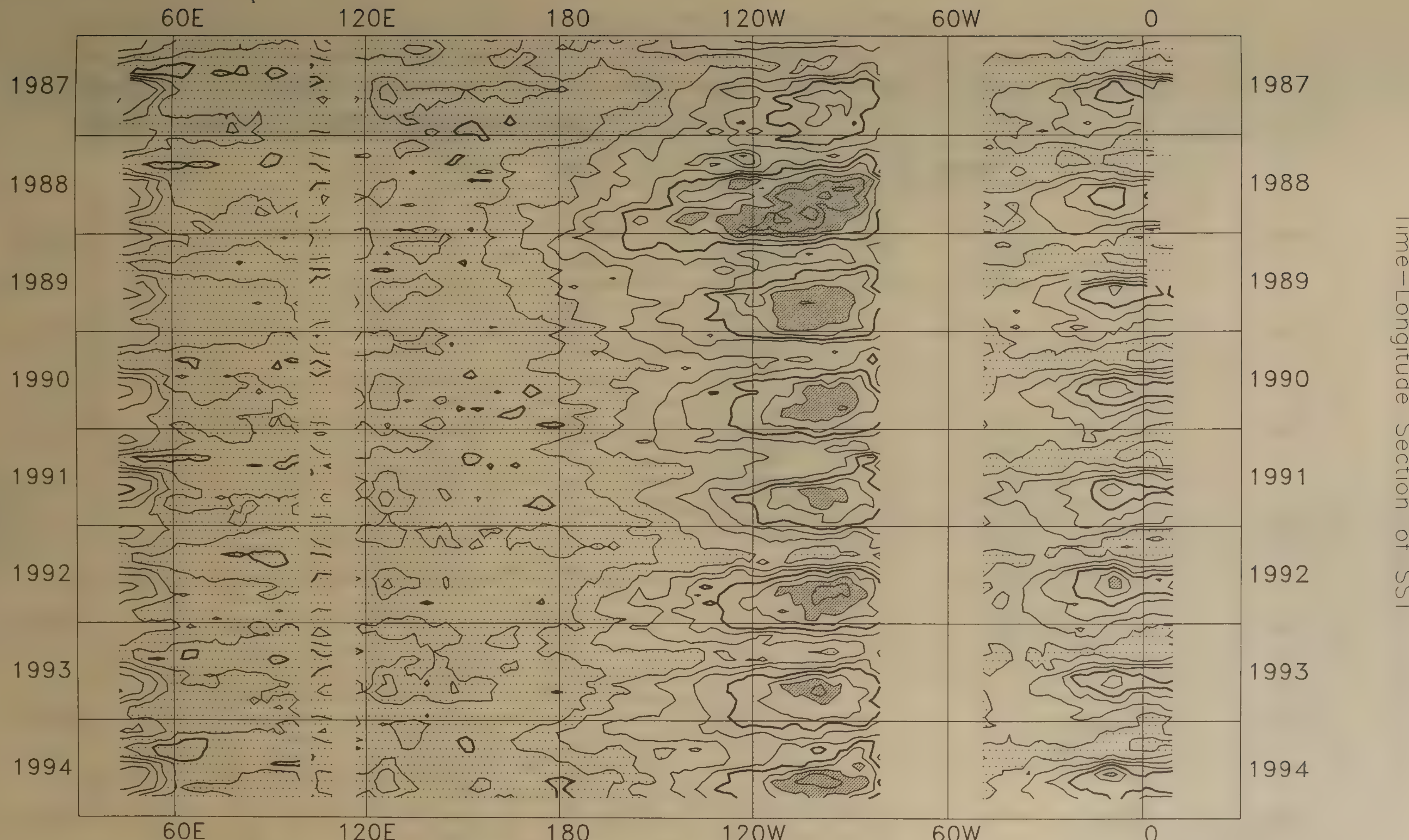
Fig.5　Sea level anomalies obtained from the 1975 to 1986 mean SEP. sea level adjusted for atmospheric pressure (SEP 1994).
This figure is prepared by the SOC of ISLP–PAC, Dept. of Oceanography, Univ. of Hawaii.

Time Series of Equatorial Pacific SST Anomalies



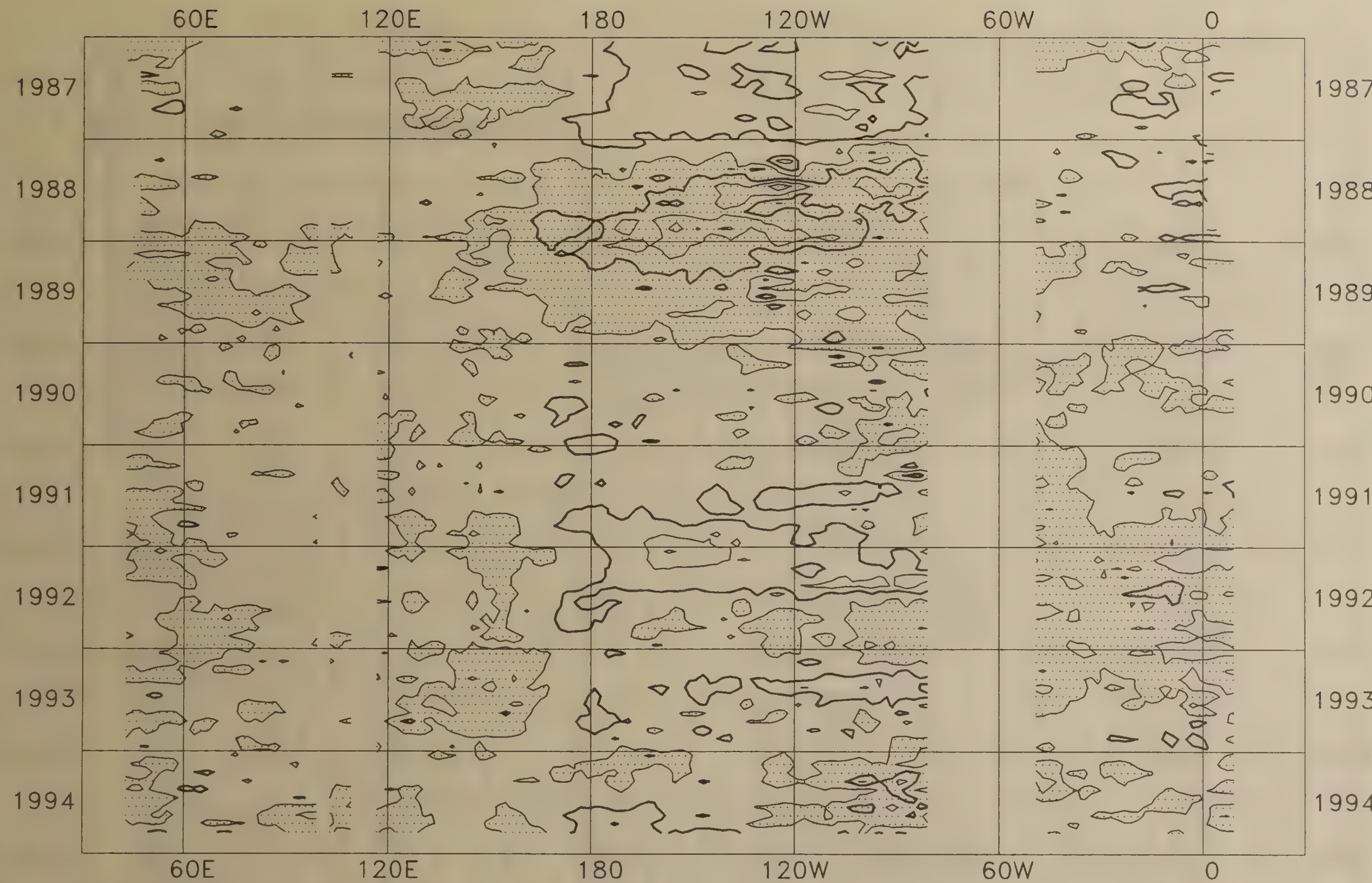
第６図　赤道太平洋海面水温偏差時系列図

Fig.6 Time series of monthly mean SST anomalies in the equotorial Pacific Ocean for the areas indicated at the bottom of the figure. Thin lines show the monthly values and thick lines their 5 month running mean. Positve anomalies (A,B,C) and negative anomalies (D) are shaded. Anomalies are computed with respect to the JMA climatology (1961−90).



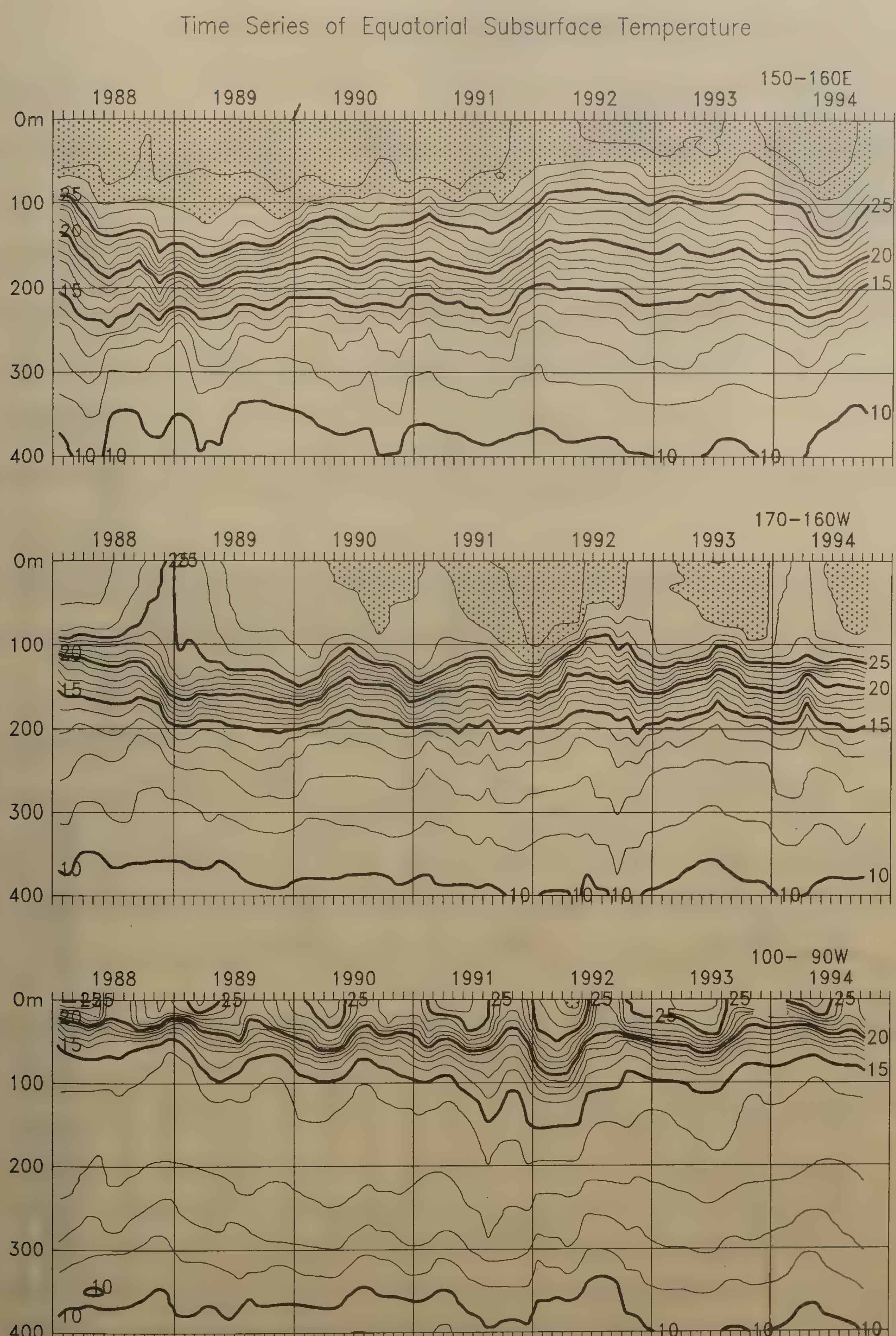
第7図　赤道に沿う海面水温時系列図

Fig.7 Time−longitude section of SSTs along the equator (2° N−2° S) in the global ocean. The contour interval is 1° C, with thick contour lines at 25 and 30° C. SST values greater than 28° C are spotted and values less than 23° C are shaded.



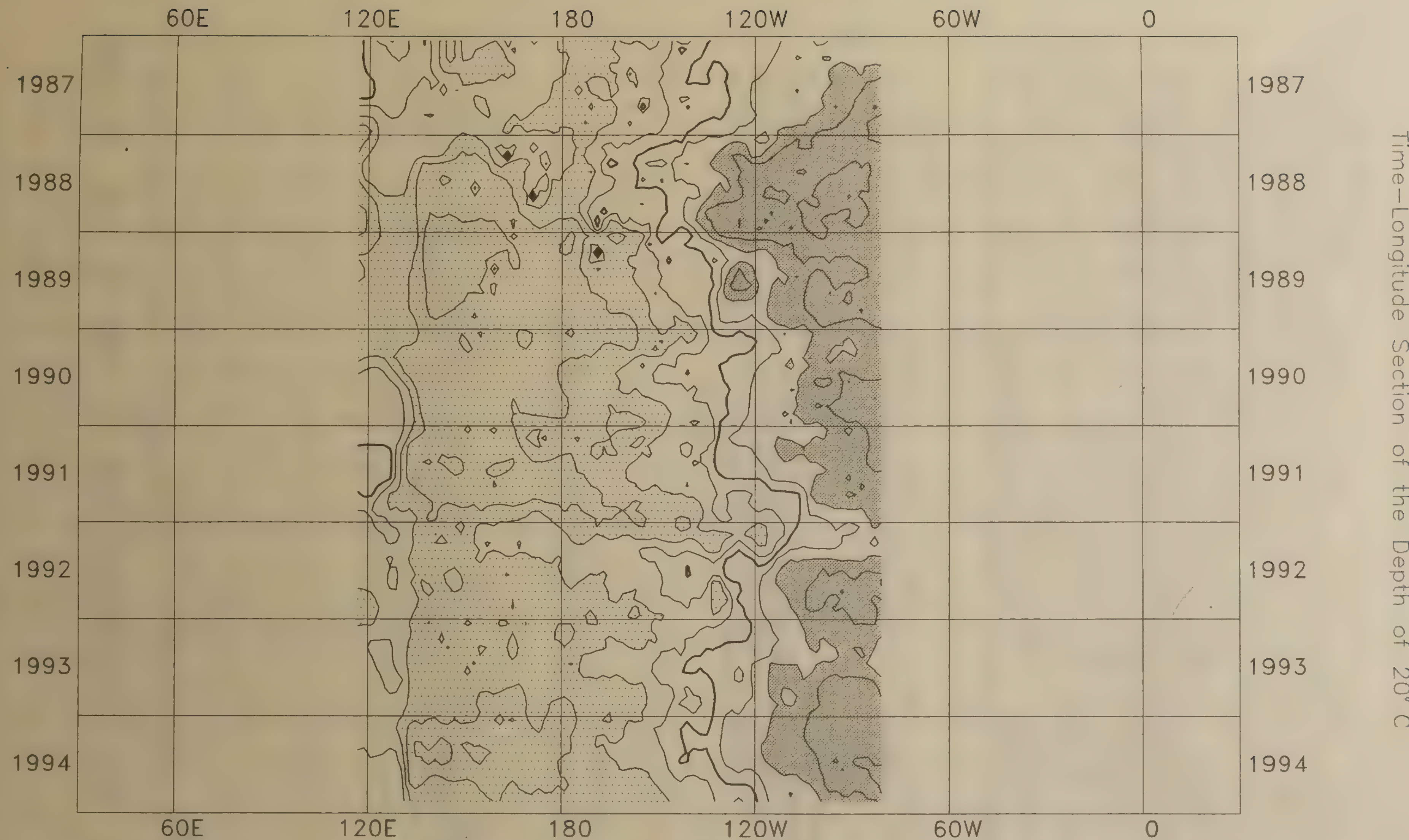
第8図　赤道に沿う海面水温偏差時系列図

Fig.8 Time–longitude section of SST anomalies along the equator (2° N–2° S) based on the JMA climatology (1961–1990). The contour interval is 1° C, with thick contour lines at +1° C and −1° C. Negative anomalies are spotted.



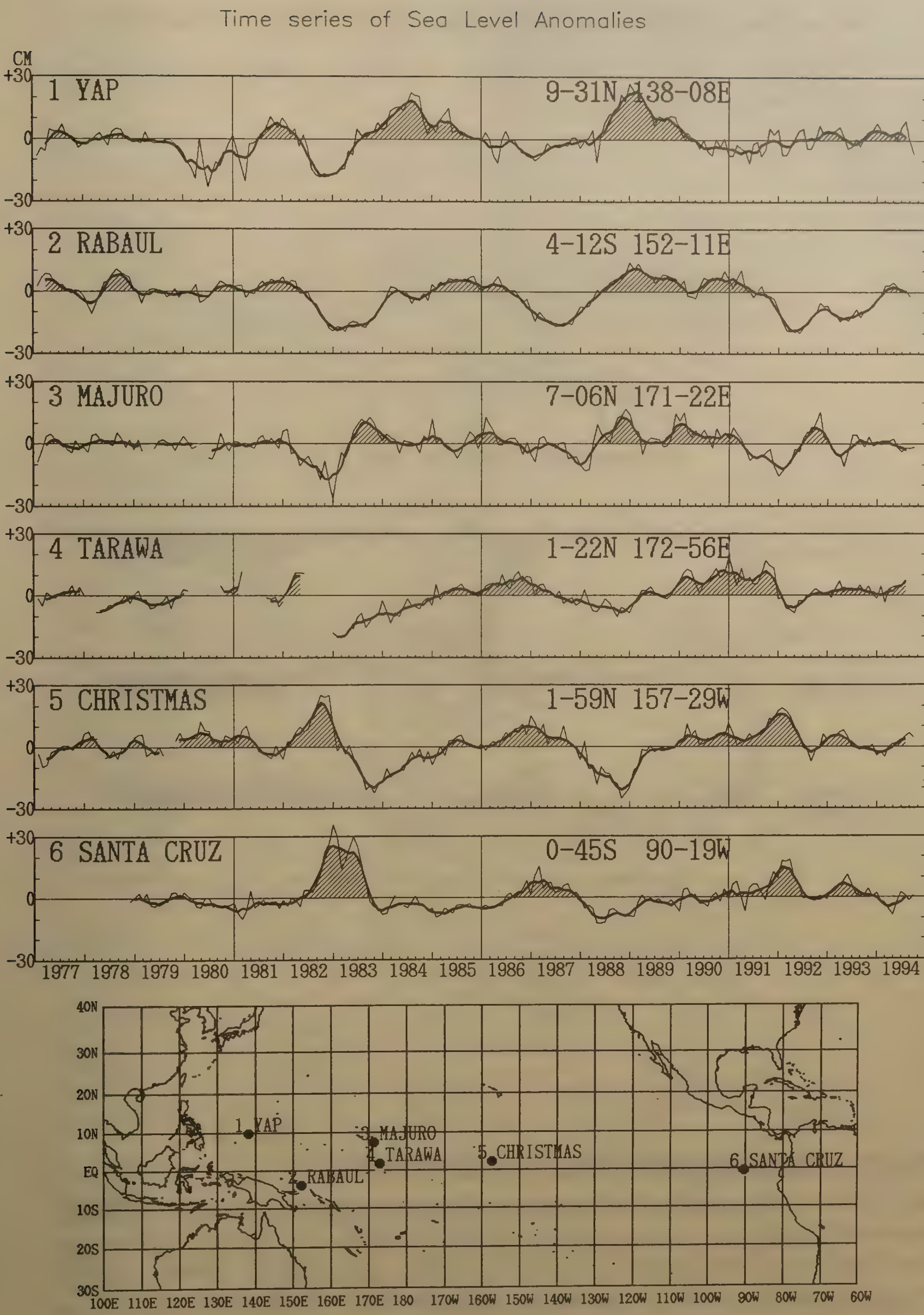
第９図　赤道太平洋表層水温時系列図（上：西部、中：中部、下：東部）

Fig.9 Time series of equatorial (2° N–2° S) subsurface temperature for the western Pacific (top, 150–160° E), the central Pacific (middle, 170–160° W) and the eastern Pacific (bottom, 100–90° W). The contour interval is 1° C with spotted shading for the values greater than 28° C.



第10図　太平洋の赤道に沿う20℃深度時系列図

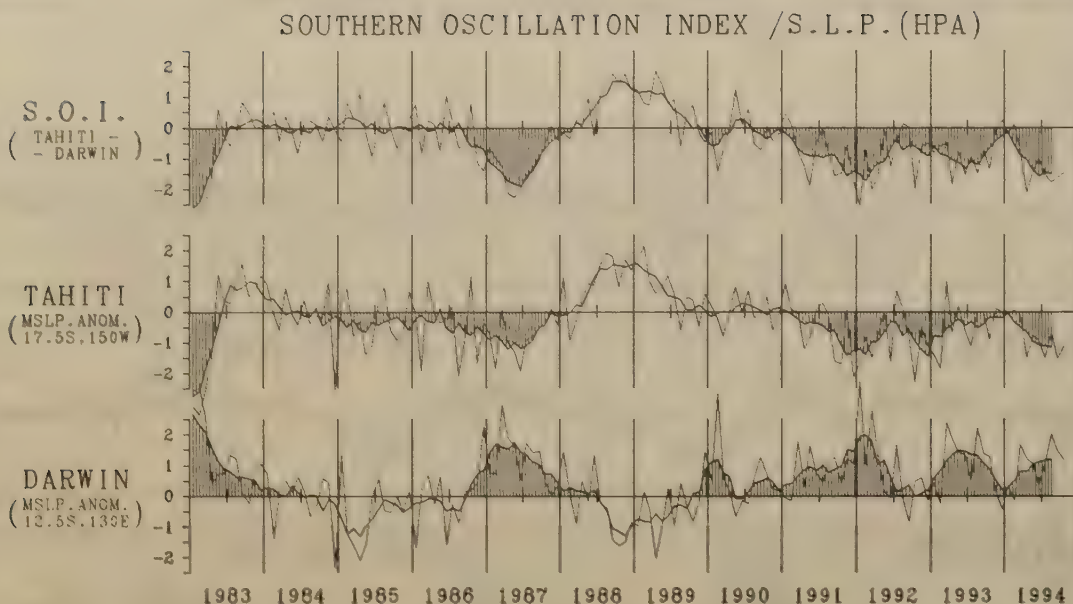
Fig.10 Time-longitude section of the depth of a 20° C isotherm along the equator in the Pacific Ocean. The contour interval is 20m with thick contour lines at 100m. Values shallower than 60m are shaded and those deeper than 140m are stippled.



第11図　太平洋月平均海面水位偏差時系列図

Fig.11 Time series of sea level anomalies based on 1976 to 1990 monthly mean sea level obtained from the stations indicated at the bottom of the figure. Thin lines show the monthly mean and thick lines show their 5 month running mean. Positive anomalies are shaded.

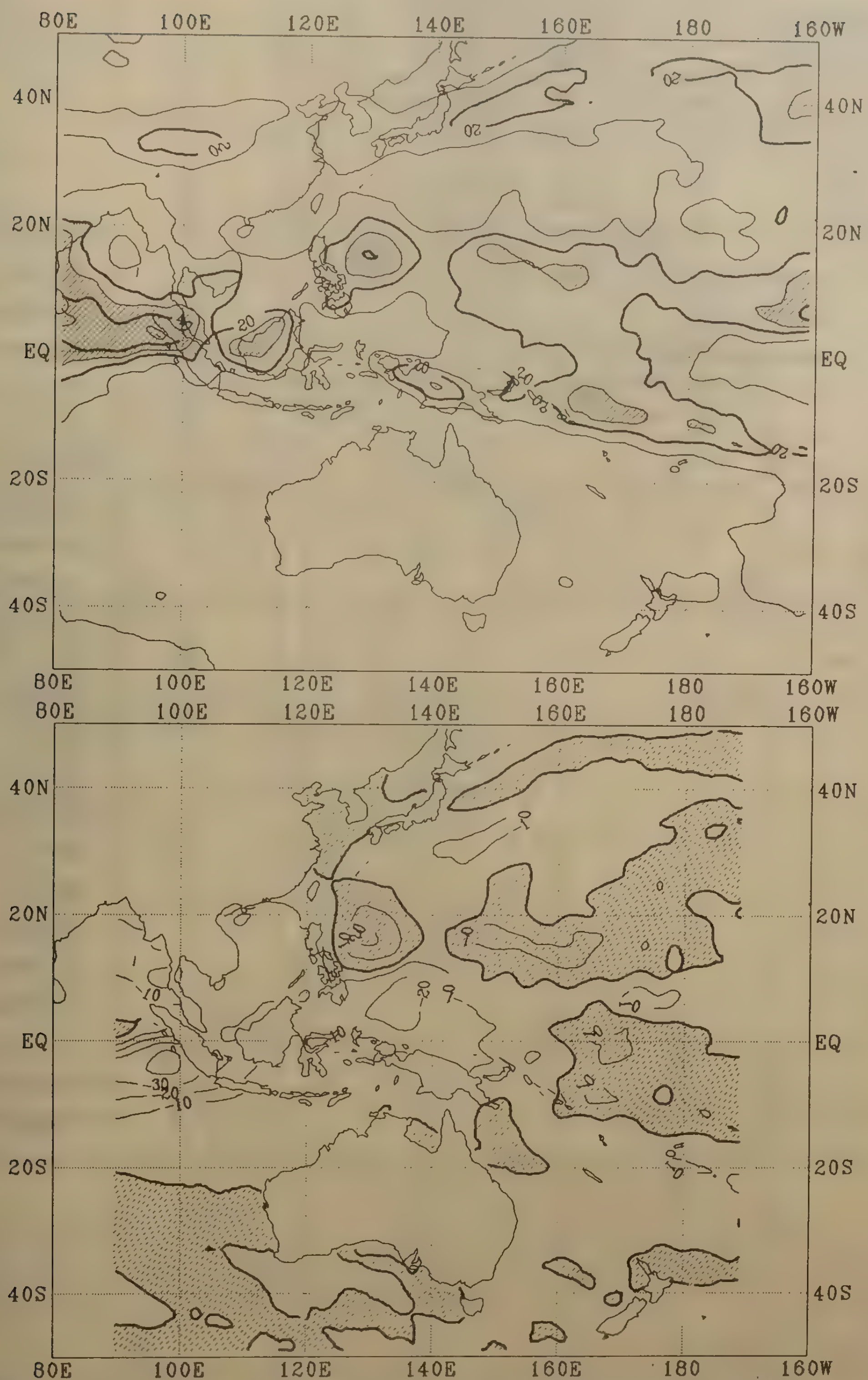
Time series of SOI & Sea Level Pressure Standardized Anomalies



第12図　南方振動指数及び海面気圧偏差時系列図

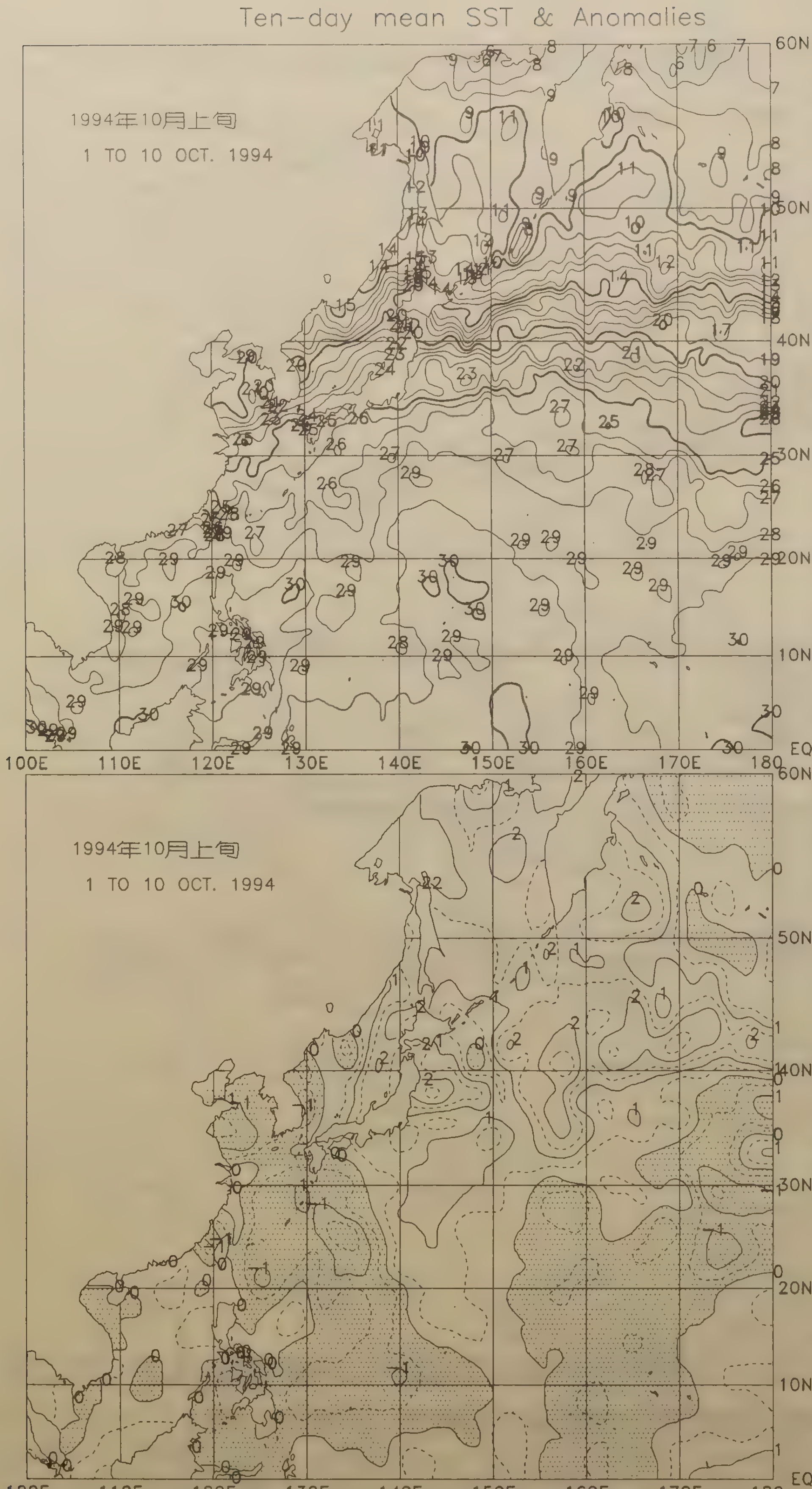
Fig.12 The Southern Oscillation Index (top) and monthly mean sea level pressure standardized anomalies at Tahiti (middle) and Darwin (bottom). Thin lines show the monthly mean and thick lines their 5 month running mean. Negative values (top, middle) and positive values (bottom) are shaded. Base periods for normals and standard deviations are 1961–1990. This figure is prepared by the Long–range Forecast Division, JMA.

High-Cloud Amount & Anomalies



第13図　月平均上層雲量分布図及び偏差図（1994年10月）

Fig.13 Monthly mean of the high-cloud amount (%, top) and its anomalies (%, bottom) in the equatorial Pacific for OCT 1994. The contour interval is 10%. Areas above 30% are shaded (top) and positive anomalies are stippled (bottom). Anomalies represent a departure from the 1978-1990 base period monthly means. This figure is prepared by the Long-range Forecast Division, JMA.



旬平均沿岸水温(℃)
Coastal Water Temperature

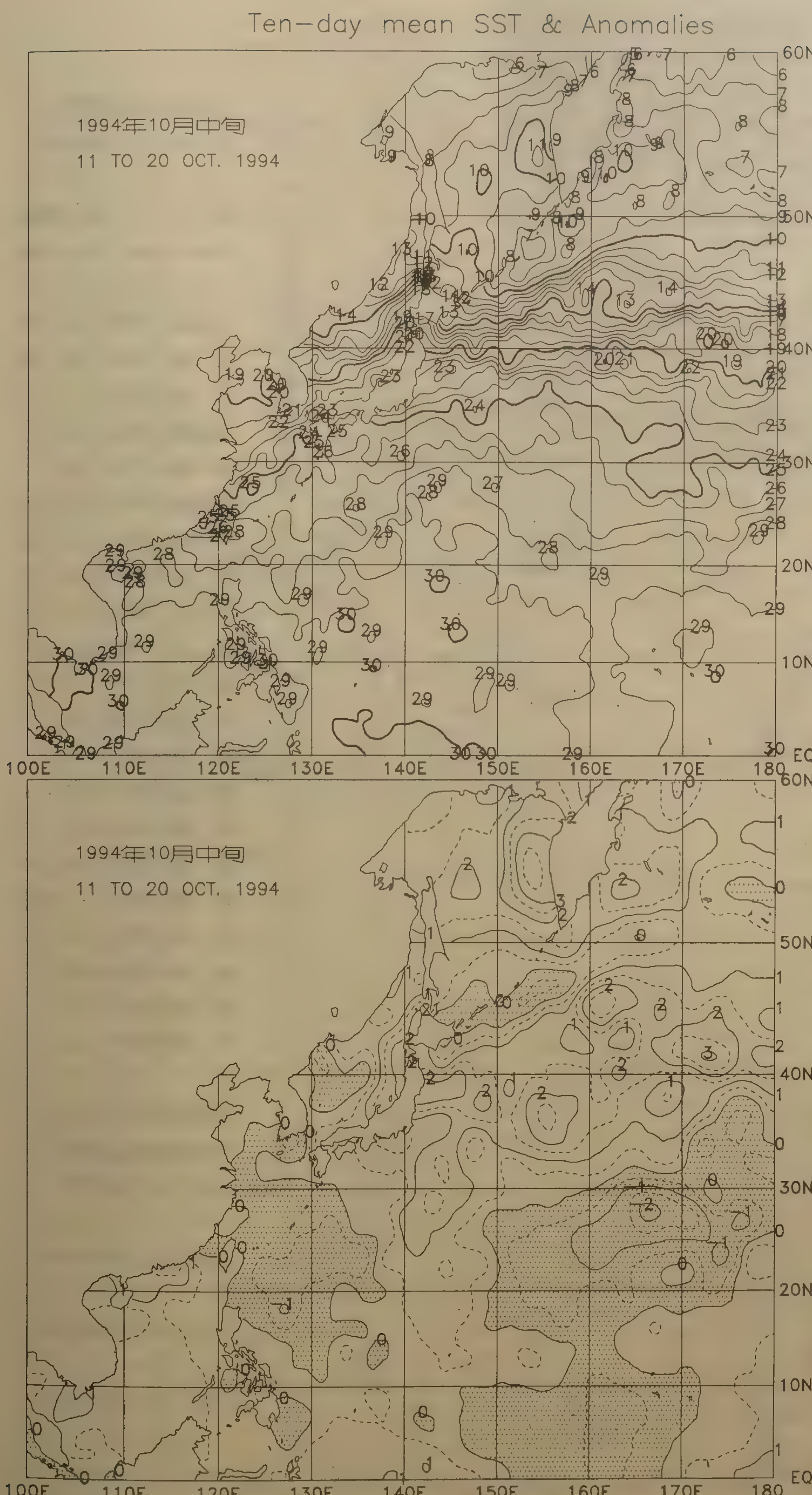
地 名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	26.6	−0.7
那　覇(47936)	26.4	−0.7
名　瀬(47909)	−	−
足摺岬(47898)	24.7	0.0
潮　岬(47778)	25.8	−
御前崎(47655)	24.1	+1.9
八丈島(47678)	25.0	0.0
館　山(47672)	23.1	+0.5
小名浜(47598)	22.1	+1.5
宮　古(47585)	19.7	+1.0
浦　河(47426)	19.0	+3.7
紋　別(47435)	14.2	−
稚　内(47401)	17.0	−
寿　都(47421)	20.0	−
江　差(47428)	20.1	−
飛　島(47587)	23.1	+1.7
輪　島(47600)	23.6	+2.5
西　郷(47740)	23.5	−
浜　田(47755)	23.4	−
厳　原(47800)	24.1	−
牛　深(47838)	24.7	−

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	22.4
四国沖	29.0N,135.0E	26.8
東シナ海	28.2N,126.3E	26.6

第14図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年10月上旬)

Fig.14 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 1st ten-day period in OCT 1994. Anomalies are computed with respect to the JMA climatology (1961−90). The contour interval is 1°C and additional anomaly contours of 0.5°C are shown. Negative anomalies are stippled.



旬平均沿岸水温(℃)
Coastal Water Temperature

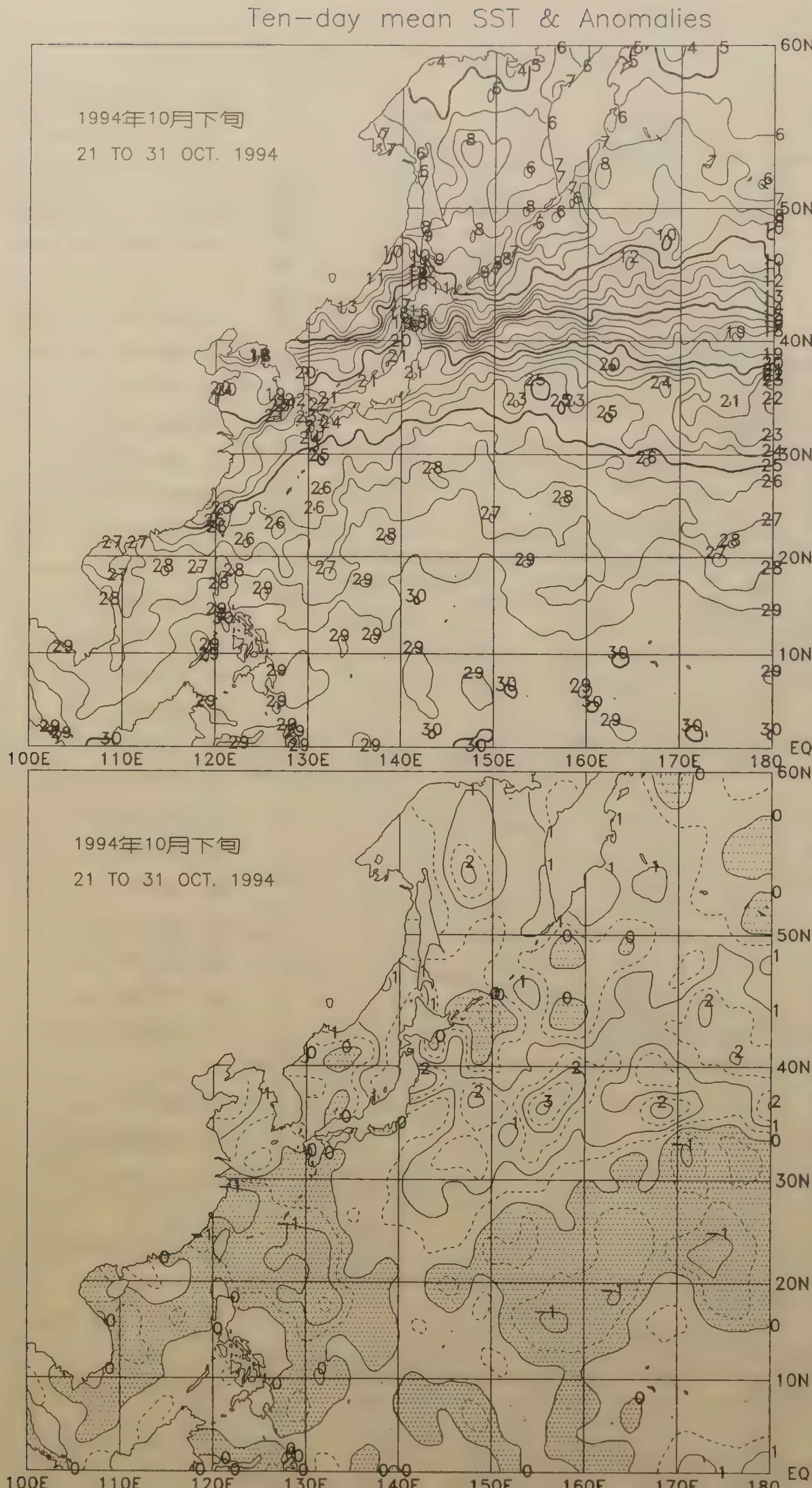
地 名 (Index Number)	水温 Temp.	偏差 Anom
石垣島(47918)	26.4	−0.2
那　覇(47936)	26.6	+0.1
名　瀬(47909)	−	−
足摺岬(47898)	24.5	+0.7
潮　岬(47778)	25.0	−
御前崎(47655)	23.7	+2.7
八丈島(47678)	24.1	0.0
館　山(47672)	22.6	+0.9
小名浜(47598)	21.6	+2.0
宮　古(47585)	19.4	+1.4
浦　河(47426)	16.5	+2.7
紋　別(47435)	14.1	−
稚　内(47401)	14.9	−
寿　都(47421)	18.3	−
江　差(47428)	18.1	−
飛　島(47587)	20.8	+0.8
輪　島(47600)	22.3	+2.5
西　郷(47740)	22.0	−
浜　田(47755)	23.1	−
厳　原(47800)	23.2	−
牛　深(47838)	24.4	−

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	20.2
四国沖	29.0N,135.0E	27.0
東シナ海	28.2N,126.3E	26.6

第15図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年10月中旬)

Fig.15 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 2nd ten-day period in OCT 1994. Anomalies are computed with respect to the JMA climatology (1961–90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



旬平均沿岸水温(℃)
Coastal Water Temperature

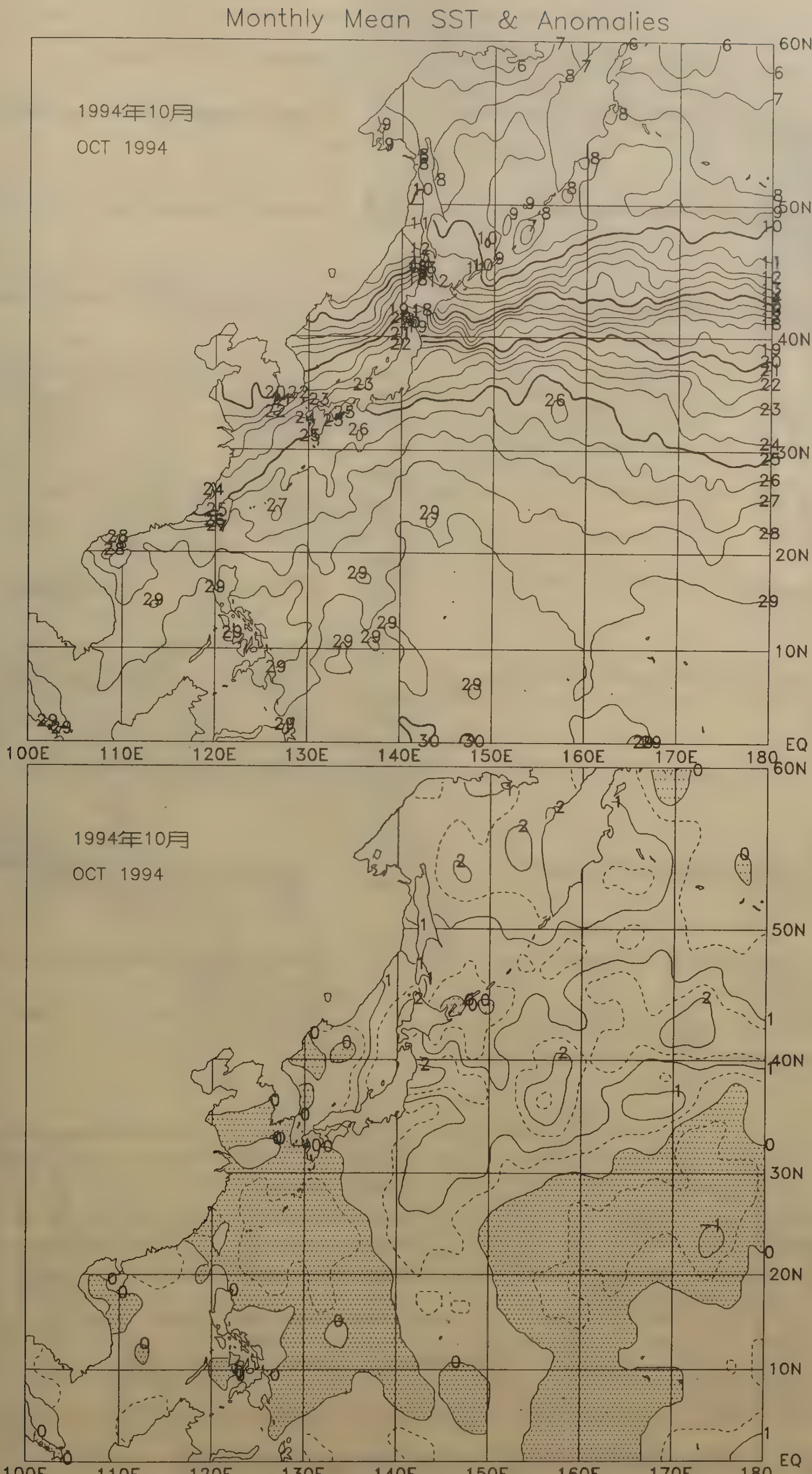
地 名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島 (47918)	24.9	−0.8
那　覇 (47936)	25.0	−0.9
名　瀬 (47909)	−	−
足摺岬 (47898)	22.9	+0.1
潮　岬 (47778)	23.6	−
御前崎 (47655)	20.6	+1.0
八丈島 (47678)	23.5	+0.1
館　山 (47672)	20.4	−0.2
小名浜 (47598)	19.9	+1.4
宮　古 (47585)	18.3	+1.4
浦　河 (47426)	15.1	+2.5
紋　別 (47435)	13.1	−
稚　内 (47401)	12.6	−
寿　都 (47421)	16.3	−
江　差 (47428)	16.1	−
飛　島 (47587)	19.8	+1.0
輪　島 (47600)	19.3	+0.9
西　郷 (47740)	20.4	−
浜　田 (47755)	20.7	−
厳　原 (47800)	22.4	−
牛　深 (47838)	23.3	−

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	18.3
四国沖	29.0N,135.0E	26.5
東シナ海	28.2N,126.3E	25.0

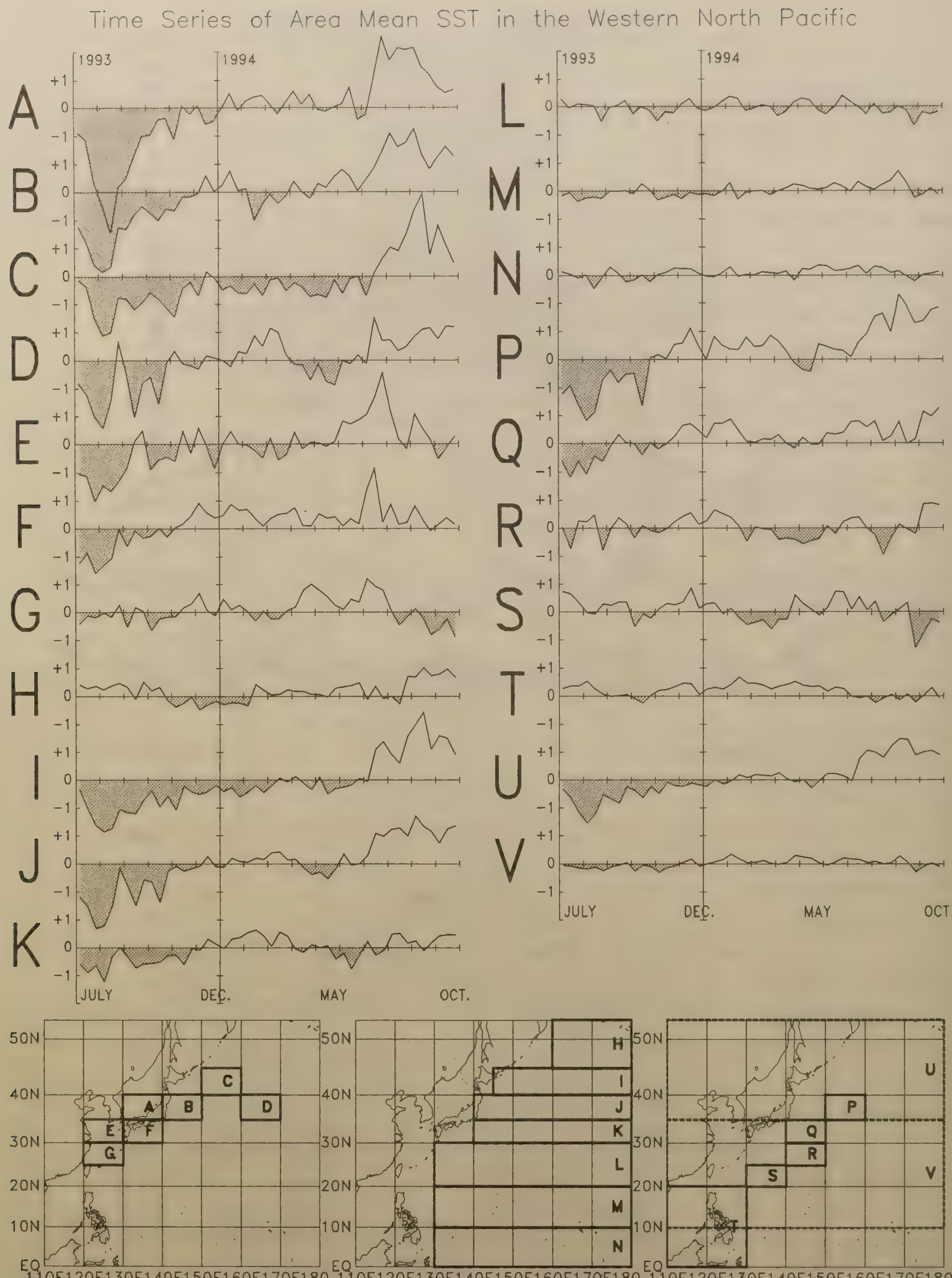
第16図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年10月下旬)

Fig.16 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 3rd ten-day period in OCT 1994. Anomalies are computed with respect to the JMA climatology (1961−90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



第17図 北西太平洋月平均海面水温図(上)及び偏差図(下)(1994年10月)

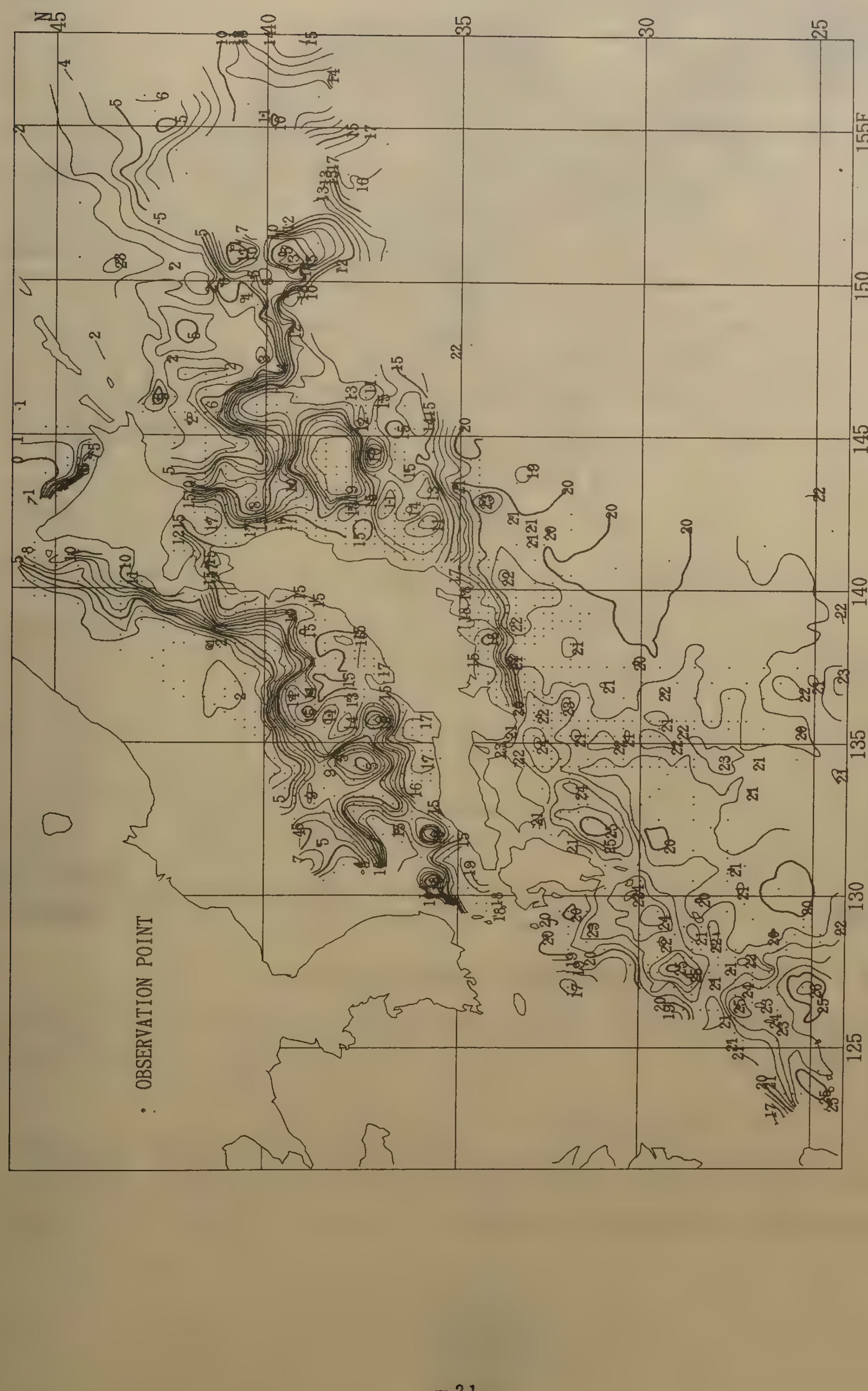
Fig.17 Monthly mean SSTs in the western North Pacific (top) and anomalies (bottom) for OCT 1994. Anomalies are computed with respect to the JMA climatology (1961−90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



第18図　北西太平洋旬平均海面水温平年偏差時系列図

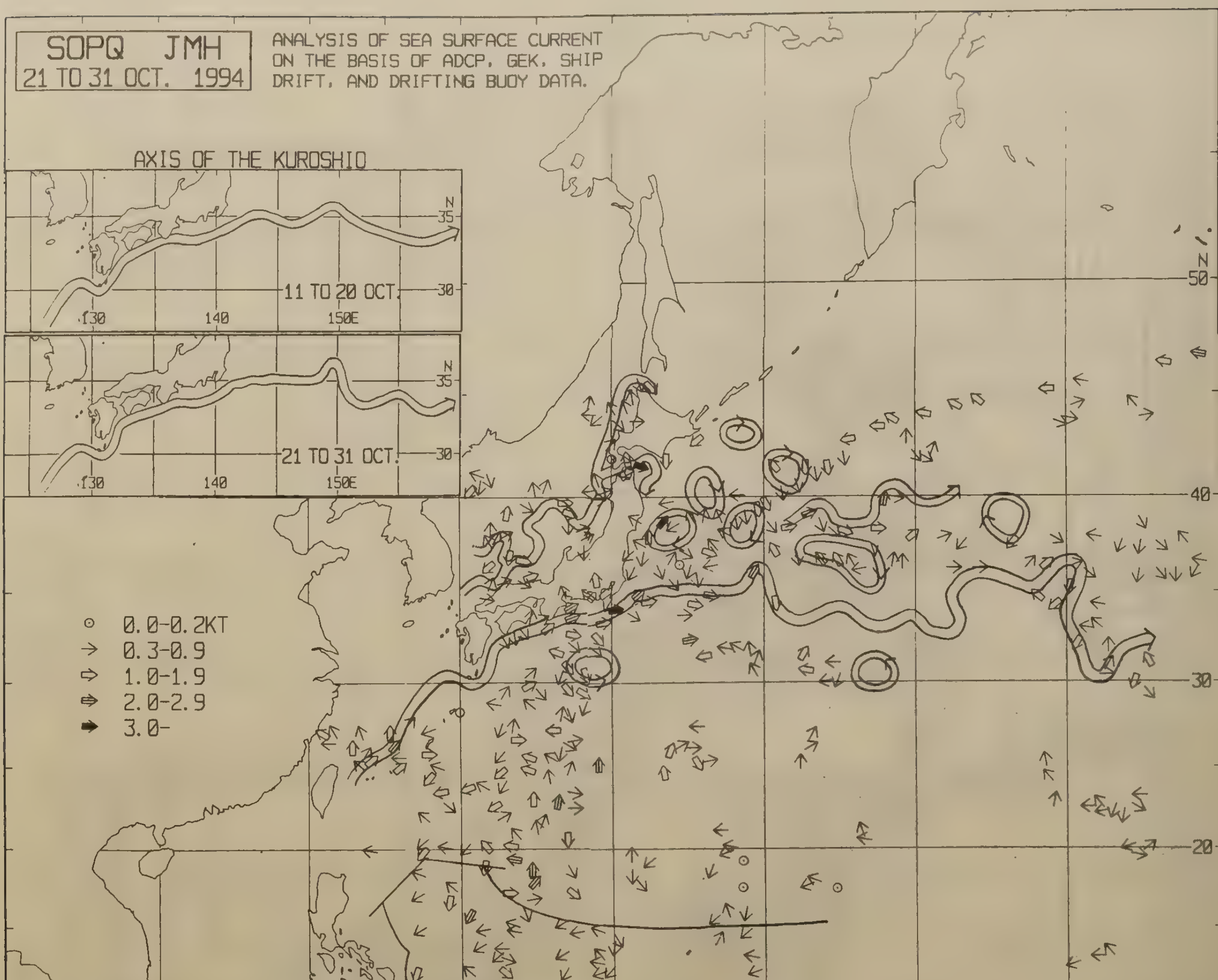
Fig.18 Time series of the ten-day mean sea surface temperature anomalies (°C) in the western North Pacific for the areas indicated at the bottom. Negative anomalies are shaded. Anomalies are computed with respect to the JMA climatology (1961–90).

100m Temperature in Seas Adjacent to Japan



第19図　日本近海表層水温（深さ100M）図（1994年10月）

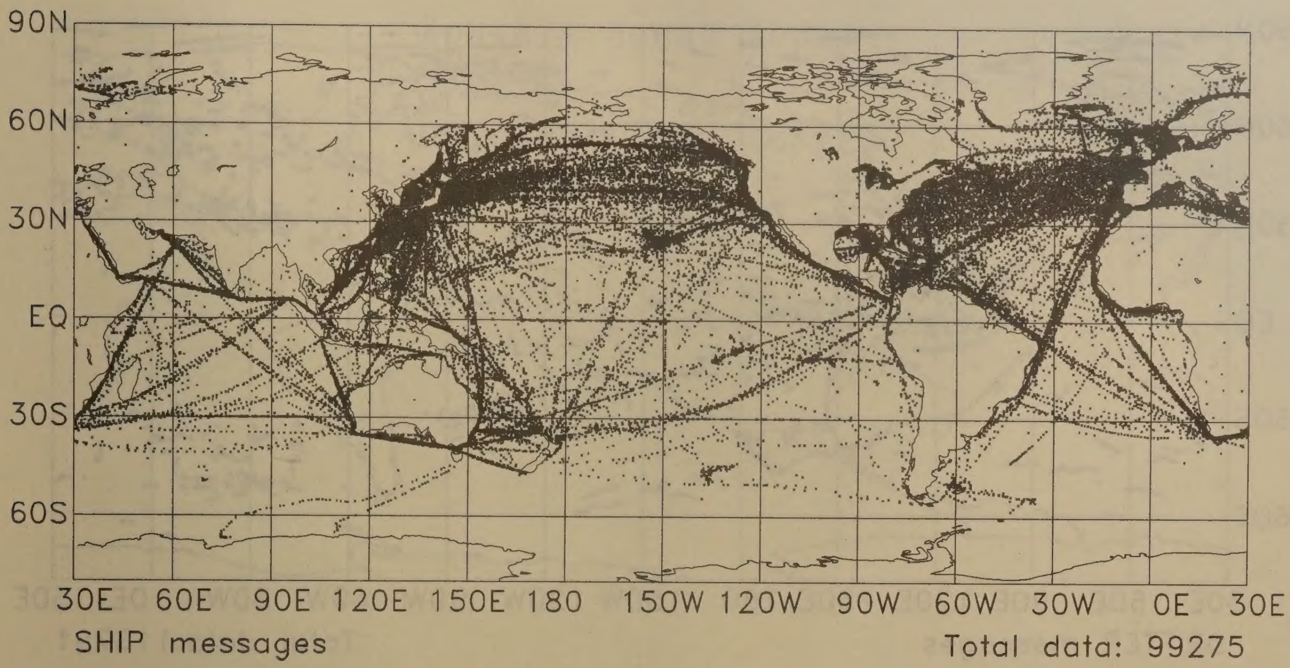
Fig.19 Subsurface (100m) temperatures in seas adjacent to Japan for OCT 1994.

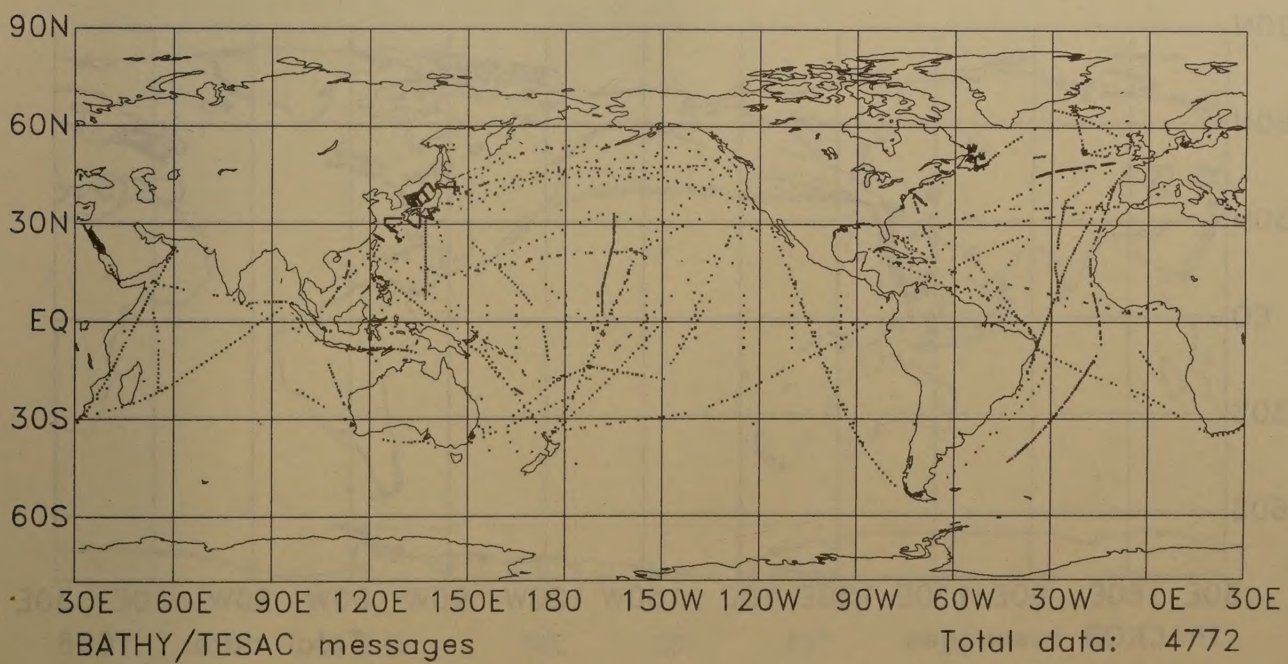


第20図　北西太平洋旬平均海流図（1994年10月下旬）

Fig.20　Ten-day analysis of the sea surface current in the western North Pacific for the 3rd ten-day period in OCT 1994. Small arrows indicate sea surface currents measured with acoustic Doppler current profilers, GEKs deployed in research vessels, and ship drift by merchant ships/drifting buoys during the month. Major currents such as the Kuroshio and the North Equatorial Current are denoted by larger open arrows.

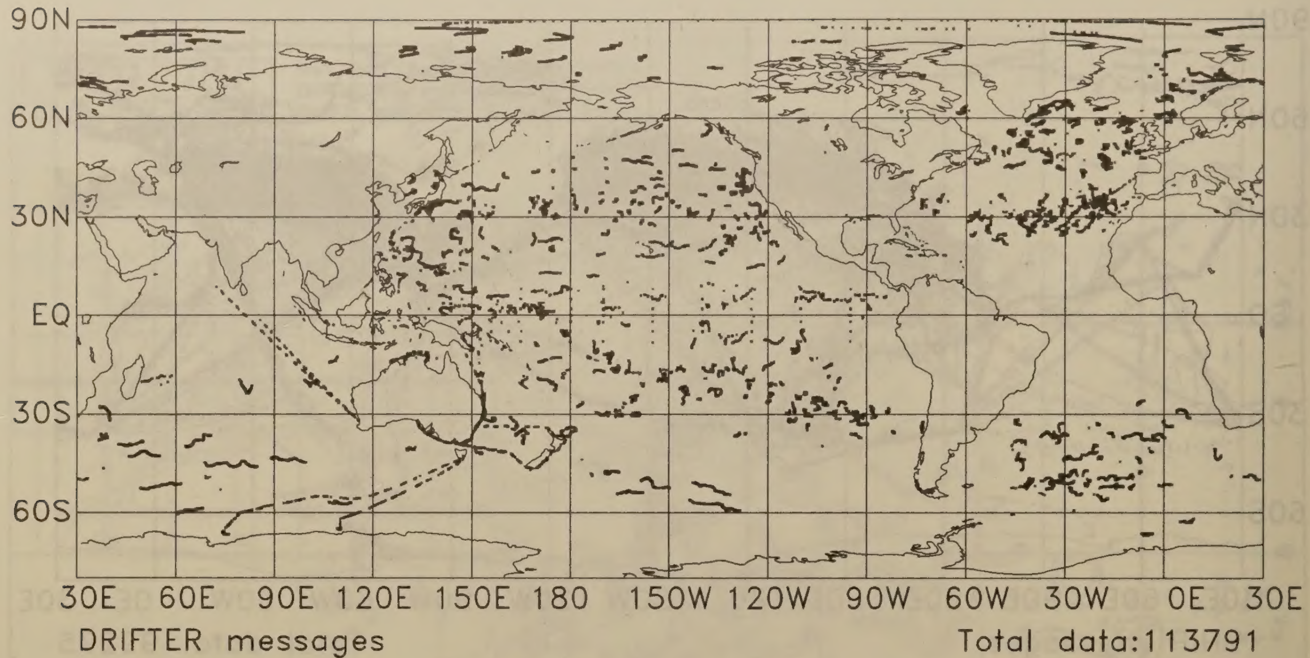
Geographical Distribution of Oceanographic Data

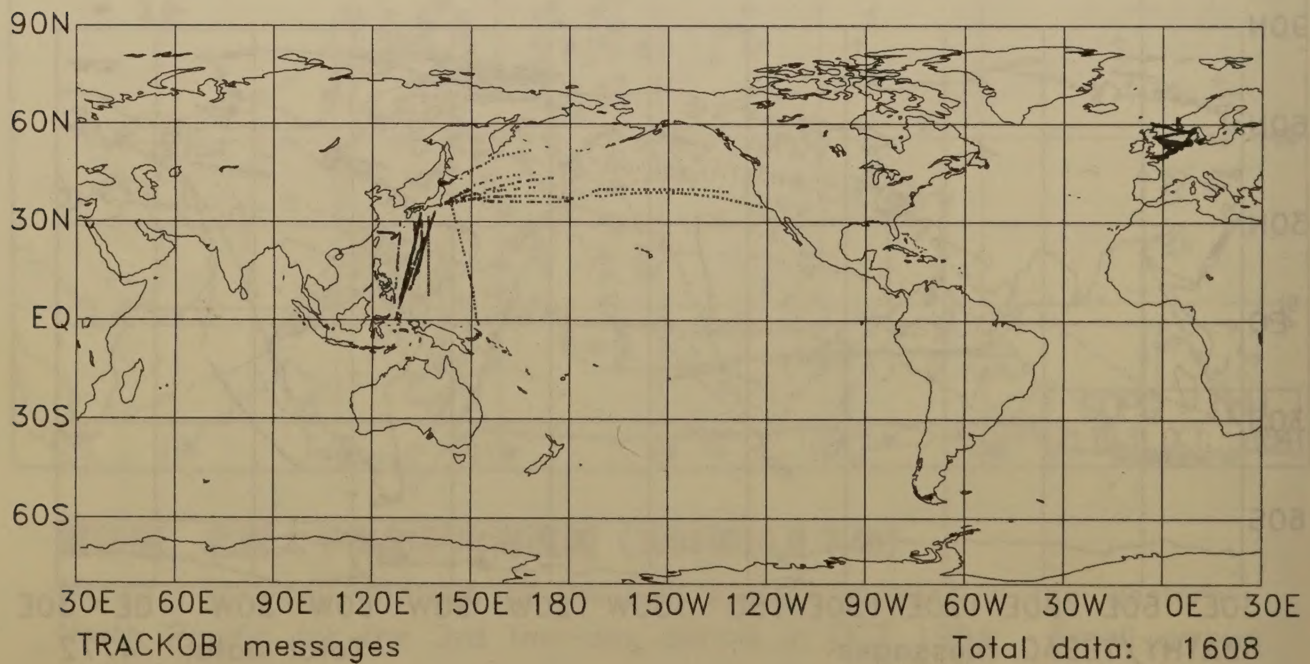




第21-1図　測点分布図(1994年10月)

Fig.21−1 Geographical distribution of SHIP messages (SST data, top) and BATHY/TESAC messages (subsurface temperature data, bottom) for OCT 1994.





第21-2図　測点分布図(1994年10月)

Fig.21−2 Geographical distribution of DRIFTER messages (buoy drift and SST data, top) and TRACKOB messages (ship drift and SST data, bottom) for OCT 1994.

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